

1 UNITED STATES BANKRUPTCY COURT  
2 FOR THE WESTERN DISTRICT OF NORTH CAROLINA  
3 CHARLOTTE DIVISION

4 IN RE: )  
5 GARLOCK SEALING TECHNOLOGIES )  
6 LLC, et al, ) No. 10-BK-31607  
7 Debtors. ) VOLUME VI-A  
MORNING SESSION

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9 TRANSCRIPT OF ESTIMATION TRIAL  
10 BEFORE THE HONORABLE GEORGE R. HODGES  
UNITED STATES BANKRUPTCY JUDGE  
JULY 29, 2013

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I N D E X

ACC WITNESSES: PAGE

WILLIAM LONGO

Direct Examination By Mr. Frost 1426

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E X H I B I T S

ACC EXHIBITS:

<u>NO.</u>	<u>ADMITTED</u>
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P R O C E E D I N G S

JULY 29, 2013, COURT CALLED TO ORDER 9:30 A.M.:

MORNING SESSION:

THE COURT: Good morning.

ALL COUNSEL: Good morning, Your Honor.

THE COURT: Okay. We're going to shift gears to Mr. Frost; is that right?

MR. FROST: Good morning, Your Honor. We call Dr. William Longo.

THE COURT: Okay.

WILLIAM LONGO,  
Being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. FROST:

Q. Good morning, Dr. Longo. Could you please state and spell your name for the record?

A. William Edward Longo. L-O-N-G-O.

Q. And Dr. Longo, where are you from?

A. I live in Cumming, Georgia, which is just right outside of Atlanta, Georgia.

Q. And what field do you have your Ph.D in?

A. In material science and engineering.

Q. And what is material sciences?

A. Material science and engineering is literally the study of materials. These materials are usually broken down into

1 four groups; metallurgy or metals. I'm sorry. Ceramics,  
2 metallurgy or metals, ceramics or minerals. Minerals such as  
3 asbestos. Plastic or polymers. And my specialty in graduate  
4 school was bio materials. And these would be materials that  
5 were implanted into the human body.

6 Q. And can you briefly describe your educational background?

7 A. Yes, sir. I received a Bachelor of Science in  
8 microbiology. I went on to graduate school in material  
9 science and engineering. I received a Masters of Science in  
10 material science and engineering. And then finally in 1983 I  
11 received my Ph.D or Doctorate in material science and  
12 engineering, all at the University of Florida.

13 Q. Now, you worked for a company called MAS. What is MAS?

14 A. MAS stands for Materials Analytical Services. Everybody  
15 just calls it MAS to make it easy. What MAS is, is a  
16 laboratory consulting group and testing facility.

17 So we have a wide range of services we provide to  
18 industry consultants, universities, the government, that sort  
19 of thing.

20 Q. Now I have a slide up on the board that sort of describes  
21 some of the areas. You're not an individual like some folks  
22 we've seen who are basically mom-and-pop consulting. They've  
23 been in the industry before, and then they get out and sort of  
24 do consulting.

25 Is your laboratory an ongoing lab that conducts analysis

1 for various people and different types of things?

2 A. Yes, sir. The facility -- the laboratory is located in  
3 Suwanee, Georgia which is right next to Cumming. And it's a  
4 20,000-square foot facility. We have -- I think the current  
5 count is 35 employees. They range in a number of different  
6 disciplines, that provide services to clients all over the  
7 country, and literally all over the world.

8 Q. Now, we have up on the board, "mold". What types of  
9 things have you done with mold cases or mold counts?

10 A. Mostly what we do with mold is just analysis. Where  
11 somebody has a suspected mold problem in a building, usually,  
12 either from water intrusion or some other factor that has  
13 caused mold to start growing.

14 We take samples and analyze them and tell you if it is  
15 mold or not. They take air samples and tell you how many mold  
16 spores per cubic centimeter of air, or per cubic meter of air  
17 that's in the air to meet certain standards. So it's both  
18 identification, the quantification, and we're certified to do  
19 the work.

20 Q. In these types of certifications, how are you certified?  
21 How is your laboratory certified?

22 A. We're certified by a couple different agencies. As you  
23 see on the bottom there, the first one is the American  
24 Industrial Hygiene Association. They have certified our  
25 laboratory to do a wide array of testing, including mold spore

1 counting and analysis, asbestos for the different types of  
2 protocols, organic analysis, air analysis, what have you.

3 The second one that we've been certified for some time is  
4 the National Voluntary Laboratory Accreditation Program, which  
5 essentially is run by -- it's an offshoot of the Environmental  
6 Protection Agency which certifies us for doing both air and  
7 bulk analysis or asbestos.

8 A2LA is another certification body that comes in and  
9 provides our ISO certification.

10 So we spend a lot of time making sure we have the  
11 certifications for the types of analysis we do.

12 Q. And it has up there lead testing/metals. What types of  
13 things have you done in the past with those?

14 A. Well, again, as a laboratory and again we're certified  
15 for doing that analysis, people who -- consultants, industry,  
16 lead testing in products that have been manufactured typically  
17 from other countries that have high contents of lead.

18 Lead paint was a common paint material that was used in  
19 all kinds of homes, industries, back in the year. So folks  
20 who want to understand how much lead may be potentially in the  
21 paint, does it contain lead, a lot of public buildings. So  
22 they send samples in, and we can analyze the paint chips,  
23 white samples, air samples, in how much lead is there, and  
24 does that exceed the recommendations or the regulations for  
25 what is allowable.

1 Q. And you have CPSC toy testing. Was that also part of  
2 that lead issue?

3 A. Correct. Typically toys, especially coming from other  
4 countries, being sold in this country, tend to use the wrong  
5 types of ingredients at times. And so we can certify that  
6 particular batch of toys coming in from a manufacturer  
7 meets the -- doesn't have leads, plus other types of organics  
8 not allowed. We do quite a bit of that.

9 Q. We will spend a lot of time talking about asbestos. But  
10 what has your laboratory done -- what types of people has it  
11 worked for outside of the asbestos arena? Who are your  
12 clients that you're doing this type of testing for, any of the  
13 testing that we're -- that -- the different types that's not  
14 asbestos related?

15 A. In our semiconductor work we have worked for the likes of  
16 IBM/Intel. In the federal government we have worked for the  
17 GSA, Governmental Services Administration. We've worked for  
18 the Environmental Protection Agency. We have worked for the  
19 FAA.

20 We have worked for a wide range of manufacturers, carpet  
21 manufacturers from around the world, furniture manufacturers  
22 from around the world, testing their products to see if they  
23 meet organic emissions standards, commonly known as VOC,  
24 volatile organic compounds. An example of that would be the  
25 new car smell. Which has kind of a pleasant sweet odor. That

1 new car smell is actually volatile organic compounds emitting  
2 from the materials inside the car. It's not really that good  
3 for you, even though it smells good.

4 So there's all kinds of standards now for different types  
5 of products for those emissions, and we certify the products  
6 that they can meet these certain activities.

7 Every carpet manufacturer in Georgia, which has a lot,  
8 has used our services. A large number of different  
9 manufacturers of office furniture used our services for this  
10 testing. We have quite a few clients.

11 Q. Now you mentioned the AIHA that certifies your  
12 laboratory. Have you been familiar with some of the  
13 statements the AIHA made concerning asbestos in the past?

14 A. I have.

15 Q. And we talked to Mr. Boelter about this AIHA Job, Health,  
16 and Safety on the care of Asbestos-Containing Flooring  
17 Materials. Is this something you reviewed in the past?

18 A. I have.

19 Q. Is this something that you agree with when they talk  
20 about asbestos being a known human carcinogen and there being  
21 no safe threshold of exposure for asbestos?

22 MR. HARRIS: Objection, Your Honor. This is outside  
23 his area of expertise to speak about health issues and the  
24 health effects of asbestos. I think they'll probably agree  
25 with that.

1 THE COURT: Sustained.

2 BY MR. FROST:

3 Q. Dr. Longo, have you done extensive work concerning  
4 asbestos and as a microscopist and material scientist, do you  
5 have to be aware of whether asbestos is a danger to human  
6 health?

7 A. Yes, sir. I typically don't testify about it. But  
8 certainly we're aware of it, because of the precautions we  
9 take inside our laboratory to make sure individuals aren't  
10 exposed to asbestos fibers.

11 Q. And are you aware of the AIHA's position on whether  
12 asbestos is a known human carcinogen, the organization that  
13 certifies your laboratory?

14 A. Yes, sir, I've seen this statement before.

15 Q. Now, have you -- other than dealing with all these other  
16 issues, have you also developed a specialty in asbestos?

17 A. Yes, sir, I have.

18 Q. And how did you develop that specialty?

19 A. Goes back many years. When I was in graduate school one  
20 of the areas that I used -- one of the techniques I used a lot  
21 of to get my Ph.D was both scanning electron microscopy,  
22 transmission electron microscopy.

23 So in the early '80s it occurred to me that the issue  
24 with asbestos, that electron microscopy is the best technique  
25 for making measurements and air samples versus optical

1 microscopy. So in the '80s I got involved in using electron  
2 microscopes to measure asbestos.

3 Over time that has -- the types of samples and the number  
4 of people have worked for me increased. So if I were to  
5 estimate how many samples we have analyzed to date involving  
6 asbestos in our laboratory, I would say we easily exceed  
7 400,000 individual asbestos samples of every type that have  
8 been sent to us from literally around the world.

9 Q. And I guess that's a good point. Are samples sent to  
10 your laboratory just in the context of litigation?

11 A. No, sir, they're not.

12 Q. What -- how do individuals send samples to MAS and what  
13 type of individuals outside of litigation send asbestos  
14 samples to be tested by MAS?

15 A. Typically they're engineering consulting, environmental  
16 engineering firms that have been hired to go and survey  
17 buildings. And in these buildings that have been built up to  
18 '72, '73 for fireproofing and acoustical plasters, typically  
19 contain asbestos. And buildings owners of all types want  
20 surveys done to see what their asbestos issue is.

21 So these engineering firms and consultants send them to  
22 us just for an analysis that tell them in those samples how  
23 much asbestos is present, if any. And if it is present, what  
24 type.

25 Q. Now besides yourself being a Ph.D in material science, do

1 you also have industrial hygienists and those type people  
2 working for your firm?

3 A. I do.

4 Q. How many industrial hygienists do you have working for  
5 you?

6 A. Currently we have three industrial hygienists that are on  
7 staff.

8 Q. Now -- and we're going to talk in depth a little bit more  
9 about the different microscopy techniques. But have you  
10 published in the peer-review literature concerning the types  
11 and techniques you and I will talk about?

12 A. Yes, sir.

13 Q. When was that published and what was published?

14 A. I believe this was published -- this was published in  
15 January of 2002 in the "Applied Occupational Environmental  
16 Hygiene Journal".

17 And what was published was essentially our work practice  
18 simulations involving the removal of gaskets from flanges,  
19 pipe flanges and valve flanges.

20 Q. Now have you also been asked to speak about asbestos  
21 issues in front of different groups?

22 A. Yes, sir, I have.

23 Q. What groups have you spoke in front of?

24 A. The American Industrial Hygiene Association, the  
25 continuing education courses at both Georgia Tech and the

1 University of New York.

2 I have also been asked to speak in front of both  
3 plaintiff's attorneys at one of their conferences, as well as  
4 defense attorneys at their conference on our work.

5 Mostly speaking engagements I've had in the past involve  
6 things like meetings of industrial hygiene -- or the -- you  
7 know, the National Asbestos Council.

8 I've even been asked to provide -- speak to the  
9 Pittsburgh Corning Trust about air levels and concentrations  
10 involved in asbestos. So really a wide range of folks.

11 Q. And have you been involved in previous bankruptcy  
12 proceedings?

13 A. Yes, sir, I have.

14 Q. What previous bankruptcy proceedings have you been  
15 involved in?

16 A. I was involved in the Celotex bankruptcy proceeding in  
17 Tampa, many years ago.

18 Q. You mentioned the PC trust, you also at least gave a  
19 presentation to the trust itself after the bankruptcy?

20 A. After the bankruptcy the -- one of the trustees saw one  
21 of my presentations about measurement, dust levels associated  
22 with the product of issue. They wanted me to come in and talk  
23 to the employees that were involved in the trust. Essentially  
24 provide them what we have found and shown.

25 And they were particularly interested in looking at the

1 high intensity lighting, demonstrating how visible dust versus  
2 dust seen under high intensity.

3 Q. That's the Tyndall lighting that we'll talk about in a  
4 minute?

5 A. Yes.

6 Q. Now, other than your work at Georgia Tech and the  
7 University of New York, have you taught other courses on  
8 asbestos over the years?

9 A. Yes, sir. I have taught courses at the American  
10 Industrial Hygiene Association meeting in which I came in as a  
11 speaker in one of their continuing education courses for one  
12 hour.

13 Also I have put on an eight-hour course for the use of  
14 transmission electron microscopy and helping industrial  
15 hygienists, certified industrial hygienists, as well as  
16 industrial hygienists, to help solve measurement problems.

17 Q. Have you done work on behalf of the federal government in  
18 the past?

19 A. Yes, sir, I have.

20 Q. What have you done for the federal government?

21 A. We have ongoing work involving the clean-up of WR Grace  
22 vermiculite sites around the country that are superfund  
23 clean-up sites in which WR Grace had many facilities around  
24 the country where they exfoliated their vermiculite.

25 Exfoliation just means taking raw vermiculite, heating it

1 to very high temperatures, causes the air to expand in the  
2 mineral and makes it fluffy, like popcorn. When they did  
3 this, they contaminated the surrounding areas.

4 So, we have ongoing projects in helping develop, both  
5 analysis, as well as doing analysis, for air samples, soil  
6 samples, and what have you.

7 We were asked by the EPA through their contractor at one  
8 point to help develop a new testing method for analyzing  
9 asbestos in soil, because of the problem of all the  
10 nonasbestos sand and dirt materials interfering with the  
11 analysis. So we did that work.

12 Q. So the EPA at that time prior to asking you, did not have  
13 a protocol for trying to find out if asbestos was contained  
14 within soil. And what you all did was, you helped them try to  
15 come up with a protocol or procedure to find out how much  
16 asbestos could be in contaminating soil?

17 A. Not quite.

18 Q. Okay. What exactly did you do?

19 A. Well, the EPA had a protocol for bulk analysis. Where  
20 you take a bulk sample of any type, analyze it by polarized  
21 light microscopy. And by using polarized light microscopy,  
22 and stereo optical microscopy, the person doing the analysis,  
23 the microscopist, can make an estimate of the amount of  
24 asbestos present, if it is present. So you can get a volume  
25 percent, tell the type, and that's been standard protocol for

1 years and years.

2           What EPA was interested in was how to enhance that,  
3 because of the interfering factors associated with soil.  
4 You're not dealing with a product where somebody has put 10 or  
5 15 or 20 or 80 percent asbestos in the material, and you're  
6 taking a piece of that material and analyzing it.

7           You're dealing with contamination that has been mixed in  
8 with the dirt, so it's not really a product. So you have all  
9 these interfering materials. So they were looking for a  
10 better method to test for that. So it's not really they  
11 didn't have a method, they needed a better method.

12 Q.    When the EPA needed a better method, you're one of the  
13 folks that came to to try to help them with that issue?

14 A.    Through their contractor, yes, sir.

15 Q.    Now have you also been involved in any EPA peer-reviews?

16 A.    Yes, sir, I have.

17 Q.    What has been your involvement in that, what are the  
18 issues?

19 A.    Two types of issues. One for a few years, I was invited,  
20 myself along with a couple other scientists, every six months  
21 to go to EPA in Cincinnati and look over their research. We  
22 would peer-review what they were doing with asbestos issues in  
23 buildings, then make recommendations for new testing, or new  
24 areas. Or if they had analysis or study done, we would  
25 peer-review the analysis.

1           The other area I was involved in was myself and a number  
2 of microscopists were invited to EPA to help them develop a  
3 testing protocol for measuring asbestos and dust. We spent  
4 two days there debating on what was the best method. And the  
5 EPA ultimately chose the method that myself and Mr. Hatfield  
6 worked on. They never published it. It was just a draft  
7 method. But we did do that work for them.

8       Q.   And so when the EPA yet again was trying to deal with  
9 issues of asbestos and dust, that's something that you've been  
10 involved with intimately with the EPA to help them try to  
11 develop protocols?

12      A.   Correct.

13      Q.   Now what's the EIA. I think it used to be called the  
14 National Asbestos Council.

15      A.   That's correct.

16      Q.   What work have you done with them?

17      A.   Well EIA was a membership organization. So when it was  
18 the National Asbestos Council, before it became the EIA, they  
19 formed committees that were interested in helping to develop  
20 and refine some of the testing protocols that were being used  
21 at the time for transmission of electron microscopy. So I was  
22 involved with that organization.

23           I joined the committee, I was elected as the vice  
24 chairman of that particular committee, and ultimately became  
25 the chairman of the committee for the electron microscopy

1 group, working with the protocols at the time, and working  
2 along the lines to improving them.

3 Q. And I have the National Institute of Building Sciences.  
4 Who is that, and what's been your involvement with them?

5 A. Our laboratory's been involved with that area, especially  
6 with the testing of products going into the buildings. So the  
7 group and my lab sit on the committees of these various  
8 organizations to help develop protocols.

9 Q. Now, you have been involved with asbestos litigation.  
10 How did you become involved in asbestos litigation?

11 A. Again, so long I almost forgot the first time.

12 But the first case I got involved in was looking at the  
13 issue of dust analysis in buildings, to see if in-place  
14 asbestos materials became dusted over time in contaminated  
15 building surfaces.

16 Since our laboratory had spent a lot of time developing  
17 that method, we were asked to do testing and testify about it.

18 Ultimately very early on I was also asked as a material  
19 scientist if we could figure out how to identify in-place  
20 products. Such as a building that has fireproofing in it,  
21 asbestos-containing fireproofing. Can you take a sample of  
22 that, analyze it and determine who made it.

23 The manufacturers of asbestos products for buildings all  
24 had formulas for what they put in their product. Once we  
25 obtained those, and be fair, through the courts, we were able

1 to determine that each product of fireproofing acoustical  
2 plaster, actually had its own fingerprint, had its own  
3 specific ingredient or set of ingredients that no other  
4 material had, called it product identification.

5 Q. Now Dr. Longo, this product identification of these  
6 products that are in place, would a person who is just looking  
7 at those products, say it's ceiling tile, floor tile, or  
8 thermal insulation, would they have any ability if it's just  
9 sitting there in place to know who manufactured those  
10 products?

11 A. Probably not. Occasionally on thermal insulation, if it  
12 has a canvas covering on it. Some manufacturers would have  
13 printed their name on it. But you don't see that too often.

14 But fireproofing, acoustical plaster, ceiling tiles --  
15 ceiling tiles sometimes on the back of the tile, but that's  
16 also rare.

17 So what we did, not so much for thermal insulation  
18 products, but fireproofing acoustical plasters and ceiling  
19 tiles, we developed the ability to analyze those materials and  
20 then tell you who made it. Sometimes we can tell you even the  
21 range of years it was made, because a lot of manufacturers  
22 made slight changes to the product while it has asbestos in  
23 it.

24 Q. Now, let's talk about thermal insulation just briefly.  
25 If a piece of thermal insulation is in place and it's been

1 covered by either a pad or some type of wrapping, if an  
2 individual who's a worker is just looking at that thermal  
3 insulation as it sits there in place, is there any way for him  
4 to know whether it contains asbestos or not, or the brand of  
5 those products, just looking at it?

6 A. You're not going to be able to know the brand. It  
7 depends on how much knowledge the worker had. If the worker  
8 had knowledge about when the material was put in, and had  
9 knowledge that these materials had asbestos in it during  
10 particular times, then maybe. But a lot of times no.

11 Unless you do an analysis, or you have additional  
12 information, the age, that sort of thing, you wouldn't be able  
13 to.

14 Q. And isn't that one of the things that happens throughout,  
15 like, say a refinery. You treat everything as if it contains  
16 asbestos, but you really have to do that bulk sampling to  
17 verify whether it does or doesn't?

18 A. Yes, sir, they always do. Anytime any facility,  
19 especially today, wants to know where asbestos is and where  
20 there is not asbestos, they would do sampling.

21 Q. Now Dr. Longo, have you -- this bulk sampling of  
22 materials, have you also done other types of testing in  
23 litigation for asbestos?

24 A. I have.

25 Q. And who have you done that for?

1 A. Which part, I'm sorry?

2 Q. The -- well, I guess the bulk sampling. Who did you do  
3 that for, then we'll go through the regular testing.

4 A. In the litigation context, when we're doing bulk  
5 sampling, it's usually our own research where we're doing the  
6 study, or we've been hired by attorneys to analyze materials  
7 to see if they have asbestos on them or not.

8 For the attorneys, most of the work we've done in their  
9 behalf has been for plaintiff's attorneys. But we also have  
10 defendant's attorneys, as well as the company send us  
11 materials when they want to know if they have asbestos in them  
12 or not. To see -- because sometimes their records are not as  
13 good as they ought to be, I guess, from all those years back  
14 and they can't quite tell.

15 Q. So -- and the last time I saw you professionally, do you  
16 remember that?

17 A. I do, it was a long day.

18 Q. Who were you testifying for?

19 A. I was testifying on behalf of Scott's Fertilizer.

20 Q. Was Scott's Fertilizer a defendant in that particular  
21 case, it was a Waters and Kraus case?

22 A. Yes, sir, they were.

23 Q. Was I taking your deposition as the plaintiff's lawyer on  
24 the other side?

25 A. Yes, sir, for I believe almost five hours.

1 Q. Maybe a little shorter than Mr. Harris. Thank you.

2 Other than the Scott's company, have you testified and  
3 been retained by defendants in asbestos litigation, not just  
4 plaintiffs?

5 A. Yes, sir, I have.

6 Q. And just generally what types of companies have you  
7 either been retained for or testified for?

8 A. Well, we have Scott's Fertilizer that I worked for, have  
9 testified in deposition for, I think, now on two or three  
10 occasions.

11 We work for some of the safety apparel companies,  
12 asbestos gloves, both Guard-Line and Steel Grip. I've  
13 testified in court for Guard-Line in Mississippi. We work for  
14 Bondo that made body filler. We work for the American  
15 Insulated Wire Company, which made asbestos wire. We have  
16 worked for General Electric where we have done testing on a  
17 couple products.

18 A hair dryer that had asbestos materials inside the hair  
19 dryer to insulate the heater coils where the air blows over,  
20 some of their appliance wire.

21 We have been retained by -- from Westinghouse. We have  
22 been retained by Abex, which was -- sold asbestos-containing  
23 brake shoes. We have been retained and done work for Lincoln  
24 Electric which sold asbestos-containing welding rods.

25 We used to work for IMO which was a pump manufacturer.

1 We have looked at -- I know there's a couple more, but that's  
2 what --

3 Q. And so the things that you and I are going to talk about  
4 here in a few minutes about the gasket studies and studies of  
5 asbestos-containing materials, you've done those type of  
6 studies on behalf of individuals bringing lawsuits and also on  
7 behalf of defendants in asbestos litigation?

8 A. Yes, sir. But to be fair, most of my work is on behalf  
9 of plaintiffs.

10 Q. And what's your hourly rate?

11 A. \$450.

12 Q. Dr. Longo, are you aware of how much money MAS has billed  
13 in this particular case?

14 A. There's two of us working on this case, myself and  
15 Mr. John Templin who is a CIH. I haven't looked at the very  
16 last bills, but I would estimate somewhere between 160- and  
17 \$170,000 for both of us.

18 Q. Nothing close to a million dollars?

19 A. No, sir.

20 Q. Now we talked a little bit about the EPA has the -- has  
21 MAS and you, yourself, have you been involved with any  
22 protocols?

23 A. Yes, sir.

24 Q. And what are protocols and what have you been involved  
25 with?

1 A. A protocol is a testing procedure. Think of it as a  
2 recipe. And the recipe starts at A and goes to Z.

3 A protocol is where -- it's the ability to show you how  
4 to do an analysis, where you go from step one to step two,  
5 step three. And the EPA was interested in developing  
6 protocols that I've mentioned before, about a better way to  
7 test for asbestos soil contamination, from these vermiculite  
8 exfoliation superfund sites which had to deal primarily with  
9 amphiboles, tremolite.

10 And also the dust analysis that we talked about, in which  
11 they were interested in having a technique to understand how  
12 asbestos in place in a building, is it causing contamination  
13 on the surfaces in that building over time, because building  
14 vibration, et cetera.

15 Q. Now, is that -- what's this concept of re-entrainment  
16 when we talk about asbestos?

17 A. Re-entrain is literally asbestos debris and dust that  
18 have typically got on a worktable or floor, and -- after the  
19 use of asbestos product. Then somebody's asked to come clean  
20 it up.

21 And this clean up -- can be a lot of times compressed  
22 air, which is not allowed to be used anymore, to dry sweeping  
23 with a broom or foxtail brush, just to get up the dust and  
24 debris.

25 That activity will re-entrain or re-suspend the dust that

1 is on the surface of the table. So if you use an asbestos  
2 product on a worktable, you're going to see over time that  
3 there is dust buildup on that table.

4 If you go back and clean that table up, you're going to  
5 have that dust be re-entrained, since it has asbestos in it,  
6 it will of course cause an additional exposure to whoever is  
7 doing that work, or bystanders happen to be around the work.

8 Q. So when you're looking at exposures to asbestos, you're  
9 not just dealing with the individual who is doing the work  
10 itself, it's people doing cleanup. Say, for example, an  
11 individual has opened up a valve and has old packing and they  
12 pulled that out and blow it with an air hose, that's a type of  
13 exposure somebody would have directly, correct?

14 A. Correct.

15 Q. And then what you're dealing with is once that asbestos  
16 is settled, somebody cleaning up later?

17 A. Correct.

18 Q. How long does it take for somebody who takes a valve and  
19 they've taken out the old packing and they blow it out with an  
20 air hose. How long does that asbestos stay up in the air?

21 A. Well, it depends. It's not all going to stay up in the  
22 air -- let me back up.

23 You know, there was a theoretical study once about how  
24 long it would take a five micrometer fiber in still air,  
25 dropped at a height of 6 feet, to touch the floor. I think

1 they calculated eight hours.

2 Q. Eight hours?

3 A. Correct. If you're using an asbestos product, and  
4 there's dust generated in the air, it's not all going to stay  
5 up there for eight hours. It won't happen.

6 What will happen is, is that over time it will start to  
7 dissipate because its fibers are running into the walls and  
8 into the ceiling. You have a tumbling effect, when these  
9 fibers are released and hit each other.

10 So it really depends on concentration, how much is there  
11 and how much is measurable.

12 We have done a study where we have measured, I think 90  
13 to 120 minutes after the activity happened, and we're still  
14 seeing 10 percent of the fibers present in the air.

15 So they do stay suspended for a long period of time.  
16 That's in our studies.

17 MR. HARRIS: Excuse me, Your Honor.

18 Mr. -- or Dr. Longo is starting to give opinions  
19 now, and I don't want to interrupt Mr. Frost's exam. We have  
20 filed a *Daubert* motion challenging Dr. Longo's qualifications  
21 and reliability of his opinions. We just ask that the court  
22 reserve ruling on his qualifications to testify to the matters  
23 that he's going to testify about today, until the court has,  
24 at the end of the trial, or the court has an opportunity to  
25 consider our *Daubert* motion.

1           THE COURT: All right. We'll hear his testimony and  
2 deal with any of that other stuff later.

3           MR. FROST: Okay. And Your Honor, I guess I'll go  
4 ahead and offer Dr. Longo at this point, since there's been an  
5 objection, that Dr. Longo, at this point, be -- is tendered as  
6 an expert in material science, electron microscopy and  
7 industrial hygiene as it relates to asbestos.

8           MR. HARRIS: Your Honor, we have made our objection.  
9 We just ask the court reserve ruling on the objection until  
10 the court has an opportunity to hear Dr. Longo's testimony and  
11 consider our *Daubert* challenge.

12          THE COURT: We'll go ahead and hear his testimony.  
13 He can testify as an expert, and we'll -- as I said, we'll  
14 deal with the challenges later.

15          MR. FROST: Thank you, Your Honor.

16 Q. And Dr. Longo, just so I do all the legal stuff, do you  
17 agree to keep all of your opinions today within a reasonable  
18 degree of scientific probability?

19 A. Yes, sir.

20 Q. Now we were talking about asbestos and how long it can  
21 stay up in the air. Is this concept of re-entrainment and the  
22 fact that it's not just the folks working with the products,  
23 but it's people who clean it up later, and also for people  
24 potentially take it home on clothing. Is that something new  
25 in the literature, is that something Dr. Longo came up with?

1 A. No, sir.

2 Q. How long have those concepts been known about asbestos?

3 A. I mean, some of the earlier studies where they're  
4 measuring exposure to workers in shipyards back in the '30s.  
5 The take-home exposure started to be published in the '60s.

6 So the measurement of asbestos and understanding about  
7 concentrations have been around for quite some time.

8 Q. Now Dr. Longo, we were talking a little bit about  
9 protocols. Have you also worked with the ASTM and what is the  
10 ASTM?

11 A. That's the American Society for Testing Materials. They  
12 develop protocols and standards in all types of testing.  
13 Everything from concrete, how hard the concrete has to be, or  
14 what the strength -- compression strength of it is an ASTM  
15 standard. To things like how many times a hinge on a door  
16 should open and close before it fails is an ASTM standard.

17 The area of -- the testing of gaskets, looking at is  
18 an -- there's an ASTM standard for that. For testing the  
19 gasket in its ability to -- on -- after it's been stressed and  
20 heated, there's an ASTM standard for that.

21 But the area I worked in was indoor air quality for ASTM,  
22 their committee. Which was developing standards for the  
23 measurement of asbestos.

24 And specifically I worked on the -- I was the lead author  
25 on the ASTM method for analyzing dust samples, using

1 transmission electron microscopy. I worked on it for five  
2 years. And when it finally passed -- and you have to  
3 understand there's over 30,000 members of ASTM. Any member  
4 can put a negative vote in and stop the method in its tracks,  
5 so you have to get the consensus of all these scientists, and  
6 that took a while.

7 But in 1996 -- 1995, I believe it was, the method finally  
8 passed the final committees and became a standard.

9 Q. And the standard, did you receive any awards for working  
10 with the ASTM in coming up with this new standard?

11 A. In 1996 I received the ASTM Scientist Appreciation Award  
12 for doing that work.

13 Q. Now you've talked a few times about different microscopes  
14 and different techniques. Could you briefly tell us what  
15 types of microscopes does your facility have when we're  
16 dealing with issues of asbestos?

17 A. Well, since you have that picture, we'll start with that  
18 one. That's our scanning electron microscope. It's an  
19 environmental scanning electron microscope. We also have  
20 transmission electron microscopes, there's one. We also have  
21 an array of optical microscopes. These optical microscopes  
22 include stereo microscopes for low power observation of  
23 samples 40/100 times.

24 We have phase contrast optical microscopes for counting  
25 asbestos -- counting fibers and using the NIOSH 7400 protocol.

1 We have polarized light microscopes for analyzing asbestos  
2 bulk samples. For asbestos content using the -- again, EPA  
3 method.

4 We have regular everyday microscopes that are typically  
5 used for looking at -- and polarized -- looking at fungus,  
6 mold spores for counting. So we have all the various types.

7 Q. Does your laboratory have all of the different types of  
8 microscopes that any of the current or former asbestos  
9 standards would require when you're looking at air monitoring  
10 data?

11 A. Yes.

12 Q. Now we'll talk a little bit more about that in detail a  
13 little bit later. But you talked about some of the research  
14 you've done. What is a work-practice simulation?

15 A. That's a study where -- as we use it, where a type of  
16 work practice that a worker would use when involved with  
17 either the application or removal of an asbestos-containing  
18 product.

19 A work-practice simulation is done under very controlled  
20 conditions. And it's under a -- and it's done in such a way  
21 that we are studying the procedures itself, as well as how the  
22 material behaves. What happens? Is it not releasing the  
23 asbestos fibers? Is it a small amount, or very significant  
24 amount? So we've done this on many products.

25 Q. Was that one of the things that was published in that

1 peer-review study, a work-practice simulation?

2 A. Yes.

3 Q. Now before we get into the nuts and bolts of that, what  
4 are background levels of exposure to asbestos?

5 A. It's the concept of, if you do not have a source of  
6 asbestos. Meaning, if I'm not disturbing asbestos products in  
7 this courtroom, but I want to know what the background samples  
8 are when no asbestos products are being disturbed or no  
9 asbestos products being present. An air sample is taken to  
10 see what the "background levels" are.

11 So that if we want to know what's in the every day  
12 environment that is not associated with a source, you take an  
13 air sample and analyze it and you can make that determination.

14 Q. And why is it important to -- if you're going to do air  
15 sampling and look at data to determine whether there is  
16 asbestos being released, say you're an individual at Bremerton  
17 Naval Shipyard and you're about to test whether gasket  
18 fabrication or doing other types of gasket work is increasing  
19 the level of asbestos in the air, why is it important to do  
20 those initial sampling?

21 A. Well, today we always do that. Back in the '70s and  
22 early '80s you didn't see background samples taken as much,  
23 because they were typically looking at a particular type of  
24 activity.

25 So it's always good to have background samples, but it's

1 not uncommon for these historical analysis like Bremerton,  
2 Dow, Shell and others, not to have the background samples. So  
3 I don't look at that as a criticism.

4 Q. Now, has there been publications -- I have the cutout  
5 from Dr. Roggli's book. Have you done work with Dr. Roggli in  
6 the past?

7 A. I have.

8 Q. And even though you guys don't agree on everything, I  
9 think Dr. Roggli has published Dr. Nicholson's work in his  
10 book that deals with this air quality, of whether background  
11 levels of asbestos throughout the United States. Have you  
12 reviewed that?

13 A. I have.

14 Q. And what is Dr. Longo's number that you use when you're  
15 looking at background levels of exposure to asbestos?

16 A. The number I use is 0.0005. It's in line with "Air in  
17 U.S. School Rooms Without Asbestos". So I try to pick a  
18 number that is not the lowest, not the highest of these  
19 different sets of air samples.

20 Q. And --

21 A. Try to be conservative as what we use as background.

22 Q. And so what -- who -- who set that particular level, or  
23 who published that level that you rely upon?

24 A. Well, the "Air in U.S. Rooms Without Asbestos" was  
25 published in this book. And I have to go back to the original

1 data where that -- we looked at that, but where that came  
2 from.

3 Q. So if you and I talk about whether the exposures are  
4 above background, we're talking above that particular level?

5 A. Yes, sir.

6 Q. Okay. Now, we talked about work-practice simulations.  
7 Could you describe what a -- in general, what you're doing  
8 when you do that work-practice simulation, just the  
9 highlights. We'll show the chamber in a minute. But what are  
10 you doing?

11 A. What we're doing is using, again as we discussed, where  
12 we're using common tools that tradesmen would have used when  
13 they were either installing or removing an asbestos-containing  
14 product.

15 And these asbestos-containing -- these are typical tools  
16 and procedures that these individuals would have used. If  
17 you're dealing with asbestos-containing joint compounds, the  
18 tools are -- if it's a dry product that they're going to mix  
19 it either with a -- what they call a potato masher or stick or  
20 electric drill with a mixer on it, we replicate those same  
21 types of work practices where we use those tools. Every  
22 person who ever installed joint compound and started with a  
23 dry powder had to mix it. And they always use these different  
24 tools. Once the joint compound is on the wall and dries,  
25 these tradesmen would have to sand it. So we replicate that

1 sanding activity.

2       So we look at and studied what is the most common  
3 techniques for either the installation or removal of asbestos  
4 product, and use those work techniques to determine if there  
5 is any exposure or not from asbestos.

6 Q.   And how do you obtain these products?  Because we're  
7 talking about stuff that wasn't -- hasn't been manufactured in  
8 a while?

9 A.   Well, it's usually -- on the plaintiff's side it's a lot  
10 harder.  We have to rely on all kinds of ways to get that.  
11 It's -- a lot of times on plaintiff's the -- their clients  
12 would have saved these products over time.  They put them in  
13 their garage or they kept them.

14       If it is things like flanges, or valves, we've been able  
15 to get with individuals who have -- I call harvest -- has  
16 removed large numbers of flanges and valves and we're able to  
17 obtain, we made site visits to get valves from museum,  
18 warship, USS Lexington.  People that purchased these materials  
19 on eBay.  So it's almost like antique time.  You have to go  
20 around and try to find it.

21       When we have worked for defendants, it's a lot easier  
22 when they want a product tested, they have those products.  
23 When we did work for Carborundum, their black magic grinding  
24 wheel, they provided one to us.  When we worked for General  
25 Electric and did work-practice studies involving one of their

1 hair dryers, they provided to us.

2 When we work for defendants and they want the product  
3 tested, it makes it a lot easier if they have the products  
4 they made.

5 When you're working for plaintiffs, you have to search  
6 more.

7 Q. Do you all videotape these demonstrations?

8 A. These simulations, yes, sir.

9 Q. Now we're going to show one of those videos in a little  
10 bit. But what is the concept of Tyndall lighting?

11 A. It's the use of high intensity lighting that at a certain  
12 angle the high intensity lighting will usually scatter off  
13 microscopic dust particles of all sorts. And that scattering  
14 allows the human eye to detect the scattering.

15 So it's a way to visualize the presence of microscopic  
16 dust that's normally invisible to the naked eye.

17 Q. And could you give me an example when I might see that  
18 outside of these videotapes? When would I might see Tyndall  
19 lighting in my daily life?

20 A. You'll probably never see it outside, because of the way  
21 the light is. In your daily life if you're sitting by a  
22 window and the light beam's coming in and the room's a little  
23 dark, it's typically easy to see the dust particles that will  
24 appear in the light beam from the sunlight, then disappear.  
25 That's probably the most common way to see Tyndall lighting.

1           If you want to see a demonstration of light scattering  
2 because the sky is blue, because of the scattering of blue  
3 light off the air molecules. Or why when the sun changes  
4 direction, goes from blue to start more reddish and yellowish  
5 colors as the sun is setting, that's because the light is now  
6 scattering off particulates. Primarily air pollution that's  
7 causing that color shift.

8       Q.   What about say I'm working in my garage and I am sweeping  
9 up dust, and things like that. What am I seeing then?

10      A.   Well, if you see the dust you're sweeping it up, that --  
11 that states that you're seeing a very high concentration of  
12 the dust.

13           If microscopic particles are in a high enough  
14 concentration, you can visualize that there's something there.  
15 You can't see the individual particles.

16           If I take a handful of respirable asbestos fibers, and I  
17 throw it up into the air, you're going to see very dusty  
18 material. Over time that concentration dissipates and it will  
19 go from being able to see it, to not seeing it.

20           Another example is cigarette smoke. Cigarette smoke is  
21 very high density right at the cigarette of the person  
22 exhaling the smoke. Very quickly though, after that person  
23 exhales the smoke, it goes, you can't see it. But if you walk  
24 in where somebody has been smoking just a minute or two  
25 before, you can smell it. And you're smelling it because of

1 the microscopic particulates that are still present that you  
2 can't see.

3       So if you see dust, we know those concentrations have to  
4 be very high in order for the particulates to scatter enough  
5 light in your line of sight that you know that something's  
6 present. But you can't ever see individual particles.

7 Q. Now we've been talking about some standards over the  
8 years, the ACGIH standard, Dreson (phonetic), and those types  
9 of standards. Is there any kind of conclusions you can draw,  
10 though, if an individual says, you know, I did this work  
11 practice and it involved a product that contained asbestos and  
12 I'm seeing dust. Is there anything we can say in regards to  
13 those type of standards?

14 A. If you're seeing dust, and it's an asbestos-containing  
15 product, and it's not under where you have high intensity  
16 lighting or you have -- you're working in an area where the  
17 sunlight is coming in at a certain angle, what you can say is,  
18 that that concentration of dust, asbestos dust you're seeing  
19 without any aid of high intensity lighting, is higher than  
20 five million particles per cubic foot.

21       You have to have that concentration much higher in order  
22 for you to see it. At 5 million particles per cubic foot  
23 concentration of asbestos dust, is going to be completely  
24 invisible to the worker, in my opinion, without some aid of  
25 lighting that is different than the normal, say sunlight

1 coming in on the factory floor would have.

2 Q. Now how small are these asbestos particles we're talking  
3 about?

4 A. Asbestos particles are typically measured, not in  
5 millimeters or inches or feet. They're measured in  
6 micrometers. One micrometer is one-millionth of a meter.

7 So if you were to take a meter and slice it evenly one  
8 million times, each one of those slices would be a micrometer.

9 The human hair, the width of a human hair is 100  
10 micrometers. The width of a chrysotile fiber is typically  
11 about .04 to .05 micrometers. So the width of an asbestos  
12 fiber is many thousandths of times less than the width of a  
13 human hair.

14 Q. Less than a human hair?

15 A. Correct. The width of a typical chrysotile fiber, not  
16 the length, but just the width of it, is typically thousandths  
17 of times less than the width of a human hair.

18 Q. Let's say I had a thimble of chrysotile asbestos fibers.  
19 Can you approximate how many asbestos chrysotile fibers might  
20 be in, like, a thimble?

21 A. Well, if you take a gram of short chrysotile fibers -- or  
22 excuse me, one microgram. One microgram would have somewhere  
23 in the neighborhood of 200 million. So one-millionth of a  
24 gram would have approximately 200 million fibers of  
25 chrysotile. A thimble full, half a gram maybe, quarter of a

1 gram.

2       So you're looking at billions, if not trillions of  
3 chrysotile fibers in a thimble full -- in a thimble full.

4 Q.   Now this Tyndall lighting that we were discussing, is  
5 this something that Dr. Longo came up with?

6 A.   No. It would be called different than Sir John Tyndall.  
7 Sir John Tyndall was a British physicist who developed this  
8 concept in approximately 1860. He was a British physicist.  
9 And the ability of microscopic particles to scatter light  
10 is -- that he developed, essentially is the basis of all the  
11 laser light scattering and measurement techniques for airborne  
12 particles that are used today.

13       It's not something that I developed. I used a technique  
14 that other people have used.

15 Q.   And I have a slide up there. It's got Sir John Tyndall  
16 which we talked about. Says Tyndall lighting discussed in  
17 numerous textbooks. Where has Tyndall lighting been discussed  
18 in the literature?

19 A.   Textbooks typically, college chemistry textbooks because  
20 it's one of the techniques they talk about visualizing  
21 microscopic particles of all different sorts of liquid.

22       It has been published both in my paper, as well as in  
23 1970 in another scientific journal. Many manufacturers of  
24 asbestos products have cited the use of Tyndall lighting,  
25 including Johns-Manville, Union Carbide.

1           It is a protocol that is published by the Health and  
2   Safety Executive, which is in England called there, it is the  
3   Dust Lamp, methods for the determination of hazardous  
4   substances. That's all predicated on the use of high  
5   intensity lighting.

6           The Environmental Protection Agency, in one part of their  
7   protocol uses Tyndall lighting to be able to visualize the  
8   re-entrainment of particles involved in some of the issues of  
9   vermiculite in homes.

10          So it's not an area that I came up with. It's an area  
11   that has been used by others.

12   Q.   And besides being used in basic science books and being  
13   cited by industry, cited by EPA, has Tyndall lighting been  
14   generally accepted in the scientific community as a concept?

15   A.   Yes.

16   Q.   Now you talked about the EPA. That particular protocol,  
17   did you all, in doing your studies, have you followed some of  
18   the EPA's protocol?

19   A.   Yes, sir. We -- we referenced the EPA protocol in our  
20   studies, because it primarily uses -- EPA talks about the use  
21   of a high-powered narrow beam spotlight, Tyndall lighting, in  
22   part of their protocol. So we reference that in some of our  
23   studies.

24   Q.   Now, I also think that EPA protocol, if I remember right,  
25   talks about a particle counter; is that correct?

1 A. Correct. The entire protocol uses both high intensity  
2 lighting to Tyndall lighting. And then it uses a particle  
3 counter to take real-time particle measurements, and put those  
4 particle measurements on the video via computer.

5 We didn't use that part of the protocol, because we  
6 weren't interested in total particles, we're primarily  
7 interested in fibers. So we used another technique to measure  
8 the concentration of fibers in the study, not just overall  
9 particles.

10 Q. And when -- we're going to look at the video, we're going  
11 to see when it's normal lighting versus Tyndall lighting. Is  
12 what we're seeing with the Tyndall lighting, is that all  
13 asbestos?

14 A. No, of course not.

15 Q. Can you explain what we're going to see here in a little  
16 bit?

17 A. You're going to see dust generated from work activity  
18 involved in removing an asbestos-containing gasket off a  
19 flange. This will be both scraping and hand wire brushing,  
20 scraping and electric-powered grinding.

21 That gasket that's being removed off that flange, has an  
22 asbestos content, I think somewhere around 70, 75 percent. In  
23 which is consistent with what the manufacturers say they put  
24 in these compressed sheet gaskets.

25 So the concentration of asbestos by weight and the dust,

1 I wouldn't -- I don't think there's any reason to believe that  
2 it would exceed what was actually in the product, you get a  
3 mixture of whatever the materials are in the product.

4 If you're using a product that has 10 percent asbestos in  
5 it, it's my opinion that the dust that's seen in the Tyndall  
6 lighting will be approximately 10 percent.

7 If you're pouring raw asbestos, then what you're seeing  
8 in the Tyndall lighting is all -- is 90, 99 percent asbestos  
9 and some other minerals that may be in there.

10 So I believe it's dependent on what's in the material.  
11 So if it's thermal insulation and it's 15 percent, then the  
12 amount of asbestos in that visible dust cloud under Tyndall  
13 lighting would be approximately 15 percent.

14 Since these materials are homogenous in makeup, they have  
15 the ingredients mixed throughout. So there's no reason to  
16 believe it would be different other than what's in the product  
17 themselves.

18 Q. So that's why it's important to look at the products  
19 themselves and how much asbestos they contain?

20 A. Yes.

21 Q. Now does work-practice simulations, we talked about  
22 securing the exemplars of asbestos products. You determine  
23 what the workplace activities are. How do you do that, and  
24 what did you do in regards to the Garlock study -- I'm sorry,  
25 the gasket studies. How did you do that?

1 A. Well, we interviewed both pipefitters and steamfitters.  
2 Read many, many depositions of steamfitters and pipefitters.  
3 They all talked about three primary tools that they used.  
4 There was some -- these three tools were typically a stiff  
5 putty knife, a hand wire brush and a grinder.

6 The grinders were typically side grinders, either  
7 electric or pneumatic or air-driven grinders. Every now and  
8 then somebody would use something a little different, sander,  
9 sometimes you'll see filing. But by and large, the majority  
10 of these individuals would use those three tools.

11 So our work-practice study was based on the use of those  
12 three tools for gasket removal; a stiff putty knife, a hand  
13 wire brush, and a grinder with a wire wheel -- with a wire  
14 wheel on it.

15 Q. And when you have individuals conduct that same type of  
16 work that you've either interviewed people about or found in  
17 descriptions of workers over the years, what are you  
18 collecting and how are you going about that?

19 A. I'm sorry. Could you repeat that?

20 Q. After you sort of determine the work practices, what --  
21 what are you doing in the chamber, how -- what's that process?

22 A. I'm sorry. I misunderstood. In the chamber we're using  
23 those same work practices. On a flange, either off a pipe  
24 flange or a valve flange, we first try to scrape as much of  
25 the material off as possible.

1       The residual gasket -- and these are gaskets that have  
2 now been in place for some years. We don't know how long  
3 they've been in place. But they have been in place, and we  
4 use these techniques.

5       If it's scraping and wire brushing, again, as much as  
6 possible is scraped off the flange. Then the residue that is  
7 left on the flange surface is wire brushed off until you get  
8 the material off. For grinding, same thing.

9       Q. And I have up there, perform the work activity. Then it  
10 says, collect air samples.

11       What techniques are you using to collect the air samples  
12 and let's just refer to the gasket studies?

13       A. The air samples were collected using the NIOSH 7400  
14 method, and analyzed by phase contrast microscopy, either by  
15 our laboratory or an independent laboratory.

16       The transmission electron microscopy analysis have been  
17 both in the past indirect transmission electron microscopy  
18 analysis, as well as the NIOSH 7402 method.

19       And then we videotaped the entire work practice.

20       Q. And so what you're doing is, you're using standard  
21 methods that have been established by NIOSH in determining how  
22 asbestos is counted in these tests?

23       A. Yes, sir.

24       Q. Now I have exposure characterization laboratory ECL. We  
25 got a diagram of it in a minute. But maybe it's easier to

1 just use the diagram. What are we looking at here?

2 A. This is the diagram of the room we do the studies in.  
3 The room is 20 feet long, 15 feet wide, and 8 feet tall. The  
4 room has two filtered air intake areas.

5 What you don't see here is off to the one area of this  
6 room is a decontamination area and a shower area for when  
7 you're leaving after working with these products.

8 In order to have -- make sure that the -- if anything is  
9 released, asbestos is released in the studies, we want to  
10 contain it in the room and contain it so that the only avenue  
11 or escape out of the room is through the filtration system.  
12 So it uses negative air technology.

13 So the air exchange meaning, we're pulling air out of  
14 that room at a rate of approximately 200 cubic feet per  
15 minute. So the air has to make up what's going into the room.  
16 So you always have air going into the room, and then exiting  
17 through the filtration system.

18 It produces a slight negative pressure, but there is  
19 ventilation always going through this room while we're doing  
20 these studies.

21 Q. Now we have the slide before the ventilation rate. Is  
22 that what you were just talking about? How often is that  
23 happening, is that air circulating in the room?

24 A. It's always happening. From the time the study is  
25 started, until the time the study is completed, that we have

1 that air ventilation rate.

2 So what that's saying is, every hour the air inside that  
3 room is exchanged approximately four and a half times. Which  
4 is dilution ventilation. There's always going to be residual  
5 air that didn't make it out. So it's known as dilution  
6 ventilation.

7 Q. Do you go and test that area before any studies to find  
8 out if asbestos is in the air, since we heard asbestos is  
9 everywhere?

10 A. Yes, sir. We routinely take air samples before we do the  
11 study to see what's present, so that we know if there is any  
12 release of asbestos, we can compare it to what was in that  
13 room before.

14 Q. Now we talked a lot about gaskets. Have you actually  
15 looked at the Garlock gaskets that contained asbestos prior to  
16 them taking it out?

17 A. Yes.

18 Q. And are you familiar with the asbestos content of Garlock  
19 asbestos sheet gaskets?

20 A. I am.

21 Q. And what was generally the content of those particular  
22 materials?

23 A. They're generally around 70 to 80 percent by weight of  
24 asbestos, either chrysotile or the specialty gaskets,  
25 crocidolite.

1 Q. Now we talked about asbestos and their size earlier. Why  
2 is asbestos used in products?

3 A. Typically they're used in products to give it strength.  
4 People think about -- and because it's heat resistance and  
5 gives it strength.

6 For gaskets, it's twofold, for its heat resistance and to  
7 provide additional strength to the gaskets.

8 Think of a lot of these products that use asbestos like  
9 concrete -- not that gaskets are like concrete. But concrete  
10 is very good in compression strength but not very good in  
11 tension. If you put steel bars in it, it increases the  
12 strength of the concrete.

13 Q. Right.

14 A. If you use asbestos fibers, which are fibrous, it  
15 provides additional strength to a lot of products. Thermal  
16 insulation is a good example.

17 Fifteen percent asbestos in thermal insulation does not  
18 give it any additional insulating qualities, but it enables  
19 the material to stand up to the fact that you can handle it,  
20 and put it on, and doesn't break. It gives it strength.

21 A lot of these products the asbestos was used as a binder  
22 to give a strength to reduce cracking on drying. If it's  
23 joint compound, fireproofing, this was used so that you could  
24 spray the solid material through a hose.

25 Very few products, actually the asbestos was used to

1 protect against heat, safety apparel would be one of those.

2 Q. Now when you talked about steel being put in asbestos to  
3 strengthen it, how strong are these asbestos fibers?

4 A. Well, steel being put in the concrete to strengthen it.

5 The tensile strength from an asbestos fiber has been  
6 calculated to be somewhere in the order of 60- to 70,000 PSI.

7 Q. How does that compare to, I don't know, steel?

8 A. It's higher than steel for the same-sized fiber.

9 Q. So for the exact same-sized fiber, asbestos is stronger  
10 than steel?

11 A. Yes.

12 Q. Now we want to talk a little bit about some of the  
13 studies you've done and talk about gaskets in general.

14 How did MAS begin to start studying asbestos in gaskets  
15 and what were those early studies?

16 A. The very first study I believe happened about 1996, 1997.  
17 We were approached by plaintiff's attorney -- and I don't  
18 remember who now, it's been so long -- to look at the issue of  
19 exposure during the removal of asbestos-containing gaskets.

20 There wasn't much literature out then. But overall the  
21 concentrations being reported didn't seem to make a lot of  
22 sense to me, in that if you take a product that contains 70 to  
23 80 percent asbestos, and you grind it to the point where it's  
24 producing dust, abrading it, that you shouldn't see, in some  
25 circumstances, much higher results.

1 But we really didn't know, so we did a basic study where  
2 we took a gasket and adhered it to a metal sheet. We actually  
3 used epoxy to hold it in place. This was a gasket that had  
4 not been used in any piping environment or any valve  
5 environment. It was essentially unused asbestos-containing  
6 gasket.

7 Q. I think I heard somebody complain about those early  
8 studies that you somehow glued them to the flange. Is that  
9 that epoxy that we're talking about?

10 A. Well, it's clear we did glue them to the flange to hold  
11 them in place. Then to the surface of the gasket, not where  
12 it was glued, we ran a wire brush over it and we also ran  
13 electric drill with a wire brush over it to see if any fibers  
14 were released.

15 One of the arguments was that the asbestos fibers are  
16 encapsulated in the synthetic rubber, and no matter what you  
17 do, that encapsulation keeps those fibers from being airborne  
18 or released.

19 My thought was that if we take a brand new gasket, it  
20 hasn't been subjected to high temperature, elevated  
21 temperature in pressure, so it has not become friable and  
22 degraded. If you have a measurable release of any  
23 significance on a new gasket, then enhanced, that must suggest  
24 that gaskets that have been in place for a long period of time  
25 that have degraded, become more friable, they should also

1 release to elevated levels.

2       So we did a fiber release study. And that was back in  
3 '96/'97.

4 Q.   So the first studies what you were just doing was taking  
5 a new gasket, putting it on a flange, and trying to see  
6 whether it was really encapsulated or not?

7 A.   It was a fiber release. If it's encapsulated and the  
8 fibers do not release are somehow coated, you shouldn't see  
9 anything.

10       It's immaterial if it was epoxied to a steel grid or not.  
11 We never suggested or believed out in the field that they  
12 epoxied gaskets in place. They wouldn't do it. It was just  
13 to hold the gasket in place. It wasn't intended to replicate  
14 what happens in a steam line. It was a fiber release study.

15 Q.   And at that point later you had actual valves from steam  
16 lines. But at that point when you were doing those early  
17 studies, did you actually have any of those things to work  
18 with?

19 A.   No, not that first study.

20       The second study we received two flanges from a  
21 plaintiff's attorney in Hawaii.

22 Q.   Now, before we get much further, I want to talk about  
23 asbestos fabrication. Have you done studies where it's  
24 asbestos fabrication? What is asbestos fabrication? What are  
25 those studies?

1 A. It's typically known as secondary use of asbestos -- of  
2 asbestos gaskets. Where the manufacturer of the  
3 asbestos-containing gasket material, such as Garlock or John  
4 Crane, they'll make sheets of asbestos-containing gaskets.  
5 These sheets are typically five by five, sold in a roll. Some  
6 larger, some smaller.

7 Then if they're not prefabricated, meaning the  
8 manufacturer or some other entity makes the shapes needed,  
9 they're fabricated at the job site. These are usually done by  
10 the machinists or pipefitters.

11 What we did is look at one of the techniques. A lot of  
12 machinists, pipefitters, steamfitters talk about is using a  
13 ball-peen hammer to tap out the gasket from a piece of this  
14 sheet gasket. So they're using a ball-peen hammer to cut out  
15 the bolt holes, to cut out the inside and outside, inside  
16 diameter, outside diameter. So they're essentially cutting  
17 out a gasket to fit in a flange.

18 Q. So they would take a sheet like that, that Garlock --  
19 that big sheet. Then they would put it -- skip ahead just a  
20 little bit -- over the entire flange area, and then they would  
21 take a ball-peen hammer and size it to fit that?

22 A. Correct. This would be a ring gasket. So may not use a  
23 ball-peen hammer for this. But for a full-faced flange where  
24 they have to deal with bolt holes, as well as the inside and  
25 outside diameter, a lot of times, machinists, pipefitters,

1 steamfitters, will talk about using this technique where they  
2 lay it over the entire flange, then they use that flange as a  
3 template to cut out using the ball-peen hammer.

4 Q. Okay. So they would just take the whole sheet, and this  
5 is just an exemplar of a flange. But they would put it over a  
6 flange, and then they would take a ball-peen hammer and hammer  
7 around it to size it and cut it to put it in?

8 A. Correct. That would be a ring gasket. This is a  
9 raised-face flange. So they wouldn't do it with this type of  
10 flange. They would do it with a full-face flange, such as on  
11 a bonnet gasket, or a full-face pipe flange. So there's  
12 different types of flanges where this activity would have been  
13 done.

14 Q. Now, these studies you've actually done that using  
15 Garlock gaskets?

16 A. Yes, sir. That was, I believe style 900. That was the  
17 first study we did where we -- where I did the work.  
18 Placed -- we had the sheet of gasket material, we cut out  
19 square pieces, and then laid that piece over the flange and  
20 tapped out the excess material. And we did that for four  
21 gaskets.

22 Q. And we have up there -- we'll go through a number of  
23 these charts, but let's do this at the very beginning. We  
24 have a range and then we have an average, and that's fibers  
25 per cc. What's a fiber per cc?

1 A. It's the amount of fibers found in one cubic centimeter  
2 of air. A cubic centimeter of air is approximately the size  
3 of a sugar cube. So when we took the measurements while this  
4 work activity was going on, we made measurements of the number  
5 fibers that were generated during the activity. It's always  
6 displayed as fibers per cubic centimeter or fibers per cc.

7 Q. So you've done that for Garlock. You've done that for  
8 John Crane. What were the ranges and what were the averages  
9 that you found using -- MAS found?

10 A. Well, when we did the Garlock gasket --  
11 asbestos-containing gaskets, the range of air samples showed  
12 levels of -- this was just fabrication, without any additional  
13 work, such as filing, was 1.1 to 1.5 fibers per cc. The  
14 average of that was 1.3 fiber per cc.

15 When we did the -- when we did the study -- the John  
16 Crane fabrication was the first study we did. The Garlock was  
17 the second.

18 The John Crane fabrication study showed a range of 1.2 to  
19 1.8 fibers per cc. Had an average of 1.6 fibers per cc. So  
20 it was very close.

21 Again four gaskets. Even though it was different  
22 manufacturer, the product had the same amount of the asbestos,  
23 roughly, and it was the same type of binder.

24 So when all these variables were consistent, even though  
25 you're using a human to actually do the work, the results were

1 very close.

2 Q. Are you aware I've got MVA fabrication ranges. Is MVA  
3 Dr. Millette's group?

4 A. It is.

5 Q. Did they do the same type of testing of these gaskets?

6 A. Yes, sir. They did the John Crane, they did the same  
7 activity that we did. And their results were only slightly  
8 higher. But within the range of air. These results are all  
9 very close. So essentially three different studies doing the  
10 same types of activities, the results are all very close.

11 Q. And in fact I think we got the MVA John Crane fabrication  
12 range they found was 2.2 to 2.3 fibers per cc. And the  
13 average was 2.2 fibers per cc. Was that what they found?

14 A. Yes, 2.25.

15 Q. 2.25. I'm sorry. Those are a little higher than yours,  
16 but are they consistent?

17 A. They are in the same range that we found, same order of  
18 magnitude. So for this type of work activity, these results  
19 are very close. And it's close because we're doing -- we can  
20 control the variables.

21 Q. And other than Dr. Millette, we have a slide that was in  
22 part of your report. Have there been people outside of  
23 litigation that have done this type of work?

24 A. Yes. Here's a -- different companies. The Bremerton  
25 study, Dow, Union Carbide, Hobby One, Hobby Two, which was,

1 again, Navy studies, I believe. Then Hunter Sales Corporation  
2 One and Two which we're looking at -- they were looking at  
3 fabrication.

4 So these are fabrication-type techniques where the  
5 materials are disturbed pretty good. Not all fabrication  
6 studies have shown these results. If you have fabrication  
7 where you're just using a cutter, and it's by hand, and you're  
8 not really impounding the gaskets to any degree, the results  
9 are much lower.

10 So, but here's a range of industry results from different  
11 groups.

12 Q. And Dr. Longo, I know you weren't here, but one of the  
13 things I've heard is somehow Dr. Longo's or MAS' studies are  
14 not reproducible in regard to these fabrication studies. Do  
15 you think that's an appropriate criticism?

16 A. No. We did two different studies, two different gasket  
17 manufacturers, but using the same techniques.

18 In the fabrication study, the variables are the same.  
19 Meaning, we have the same-sized flange. We have the same  
20 thickness in type of gasket. We have the exact same work  
21 practice. Those results were very close to each other.

22 When you're taking gaskets, old gaskets -- when you're  
23 taking gaskets that have been in flanges for numbers of years,  
24 the variables increased dramatically, so it's two different  
25 things.

1 Q. Now this encapsulation theory while we're talking about  
2 fabrication. Have you looked at that encapsulation theory in  
3 regards to Garlock gaskets?

4 A. Well, not only their gaskets, but many different  
5 manufacturers of asbestos-containing compressed sheet gaskets.  
6 Yes, I have.

7 Q. What can you tell us about those particular studies,  
8 encapsulation?

9 A. Well, encapsulation, and the theory is that because it's  
10 a synthetic rubber or rubber matrix, that the rubber somehow  
11 is coating all the asbestos fibers to a degree that they're  
12 encapsulated, so they're not going to be released.

13 And I agree with that theory if you're just holding the  
14 gasket.

15 But once gaskets are starting to be abraded in some  
16 method, new gaskets where they're using -- cutting them is  
17 more aggressive than say somebody just using a hand cutter or  
18 snips, or the removal of these gaskets where they're abrading  
19 gaskets that have degraded over time under elevated pressure  
20 and temperature, you don't see that.

21 If these fibers remained encapsulated with rubber, it  
22 would really inhibit the ability to analyze the fibers by  
23 phase contrast microscopy, or transmission electron  
24 microscopy. You wouldn't be able to see the fibers.

25 The results showed that many -- most of the fibers being

1 released are not even associated with matrix materials, only  
2 with maybe particles or pieces.

3       You can't -- in my opinion, you cannot take a product  
4 that contains 70 to 80 percent asbestos and completely  
5 encapsulate it with 20 to 30 percentage synthetic rubber.  
6 It's almost the other way around.

7       What you have is a mixture. It's a mixture that mixes a  
8 synthetic rubber that is cross-linked through the process with  
9 asbestos. It's no -- and the asbestos does not react with the  
10 rubber, the synthetic rubber is inert.

11       So once you start creating dust from either the  
12 fabrication process or you're creating abrading wire brushing,  
13 grinding, creating that dust, these asbestos fibers are  
14 released.

15       A lot of the asbestos fibers inside those gaskets are  
16 bundles. These bundles have hundreds if not thousands of  
17 individual fibers.

18       The synthetic rubber can never penetrate through these  
19 bundles. It's like cabling in a conductor where you have lots  
20 and lots of cables wrapped very tightly together. The  
21 asbestos bundles are the same sort of thing. So it can't  
22 penetrate. When it's being abraded, those bundles are being  
23 ripped open. So it's impossible to encapsulate all these  
24 fibers. We don't see that in our studies.

25 Q.   Now, we brought a valve. Can you tell me what this is, I

1 guess, if I can hold it up.

2 A. It's not a valve.

3 Q. You're right. What is it?

4 A. It's a flange. It's a flange off a steam liner.

5 Q. Is this one of the materials you tested in your studies?

6 A. Yes, sir.

7 Q. Let me just pull back and got some better pictures. But  
8 when we're talking about this encapsulation, you were talking  
9 about the fact that -- whether rubber is able to encapsulate  
10 asbestos fibers that are stronger than steel.

11 You were talking about fiber bundles. Can you explain to  
12 us sort of what we're seeing here?

13 A. Well, this was an asbestos-containing compress sheet  
14 gasket that was placed on a steam line flange. We don't know  
15 how long. And the flange was cut out of the steam line -- a  
16 number of these flanges were cut out of the steam line. And  
17 then we ultimately were able to purchase them from an  
18 individual by the name of Dr. Gay who took them out of a  
19 warehouse or paper plant in Oregon.

20 Q. Now these steam lines that you've used and purchased from  
21 Dr. Gay, are you aware of who originally these steam lines  
22 were offered to?

23 A. Yes.

24 Q. Who was that?

25 A. Garlock.

1 Q. And when was that time period when these original steam  
2 lines you used in your testimony were offered to Garlock for  
3 their own use?

4 A. As I recall from the affidavit, Dr. Gay removed -- or had  
5 these flanges and valves removed in approximately 1994. We  
6 received them in 1999. In that period after he removed them,  
7 he offered them to Garlock, and they stated they didn't want  
8 them.

9 Q. Now, that was, I presume, I guess, between 1994 and 1999  
10 during the timeframe when Mr. Boelter was starting to do his  
11 studies; is that correct?

12 A. '94 to '99, yes, that would be in that timeframe.

13 Q. Okay. And so when we're looking at this steam line, and  
14 we're looking at this material in the middle. Is that the  
15 gasketing material that we're looking at?

16 A. Yes. If you could slide it over, we have both sides of  
17 the flange. What we have here is the gasketing material on  
18 both sides of the flange. What happens when the flange was  
19 broken open, the gasketing, the compressed sheet gasket  
20 material adhered so tightly to the flange surfaces, that when  
21 we opened the flange, the gasket failed in the middle of the  
22 gasket. So the gasket tore in half. Because of the tendency  
23 of the propensity of these compressed synthetic rubber sheet  
24 gaskets to adhere to these types of flanges under elevated  
25 temperature and pressure. So we just opened it, the gasket

1 tears in half. Okay.

2 Q. Then we were talking about encapsulation. What are we  
3 seeing here when looking at this material here? What's that  
4 white stuff?

5 A. Well, that white fibrous material is actually chrysotile  
6 asbestos that was put into this gasket during the  
7 manufacturing process.

8 What looks like fibers, is actually very large bundles of  
9 chrysotile asbestos. If you remember, you cannot visualize  
10 single -- a single chrysotile fiber because it's too small.  
11 Being able to see these large bundles, that bundle has to be  
12 made up of literally thousands of individual fibers. This  
13 demonstrates also, because you can see the chrysotile bundles,  
14 is that shows how this gasket over time has degraded. So you  
15 don't have the intermixed with the polymer matrix. This is  
16 just the degradation process of the synthetic rubber that  
17 holds the gasket together.

18 Q. So when we're looking at this, and we're seeing all those  
19 white materials, that's the chrysotile asbestos in the gasket?

20 A. Yes, sir.

21 Q. Okay. Now we had some pictures of flanges. Is this the  
22 same type of thing that we're talking about that we just  
23 showed on the flange?

24 A. That's the exact same flange.

25 Q. Okay.

1 A. This is before we cut it to size so we could fit it into  
2 a display box to demonstrate how these gaskets adhere, these  
3 asbestos-containing compressed sheet gaskets, how they adhere  
4 under these kind of conditions you find in a steam liner.

5 Q. These additional pictures, these are just close-ups of  
6 that same type of gaskets showing the adherence?

7 A. Yes, sir.

8 Q. And that whiteness again we're talking about chrysotile?

9 A. Chrysotile. This is a raised-face flange again. And  
10 what we call phonographic serrated edges.

11 Q. Now, have you also looked at whether these asbestos  
12 gaskets ever contained anything other than chrysotile  
13 asbestos?

14 A. Yes, sir, we have.

15 Q. And what studies have done?

16 A. Well, specifically on chrysotile-containing gaskets, we  
17 have looked at the ingredients of the material using some  
18 specialized testing to determine if there were trace levels of  
19 amphiboles present in the gaskets.

20 Q. And I think the court's heard a lot about amphibole  
21 asbestos. But what were you really looking for or what did  
22 you find when you were looking?

23 A. We were -- it's well known that -- just give some  
24 background.

25 It's well known that chrysotile deposits in Canada,

1 because of the geologist talk about, it has a tendency to have  
2 tendencies to form amphibole or tremolite, actinolite, and  
3 even anthophyllite asbestos as a contaminate of these  
4 chrysotile deposits, typically found in the serpentine rock.

5 We wanted to be able to test and determine if the  
6 chrysotile products like gaskets, if we were to use a  
7 specialized testing protocol, would amphibole asbestos be  
8 present in tremolite or anthophyllite. So we tested a number  
9 of gaskets -- we tested a number of gaskets over the years to  
10 make that determination.

11 Q. Now I have a slide up there that says asbestos fibers in  
12 1 gram of gasket. How many asbestos fibers, say chrysotile  
13 fibers, would be contained within 1 gram of a gasket?

14 A. One gram, it would be more than the 160 billion you have.  
15 A better number would be in the trillions for 1 gram of just  
16 chrysotile.

17 Q. So if we're dealing with just 1 gram of a gasket, it's  
18 not that 160 billion, it's really in the trillions of fibers?

19 A. Yes, sir. Based on the work by the Environmental  
20 Protection Agency looking at how many chrysotile fibers --  
21 short chrysotile fibers in a microgram or gram of material.

22 Q. Now we -- you did an analysis of gaskets. Have you  
23 actually done Garlock gaskets that you looked at?

24 A. Yes, sir. These are different Garlock gaskets that we  
25 received over the years.

1 Q. What did you find in regards to the Garlock gaskets when  
2 you looked at the chrysotile percentage and then whether  
3 amphibole was detected in those particular products?

4 A. For the asbestos-containing Garlock sheet gaskets, each  
5 of the samples we tested we found trace levels of amphibole  
6 asbestos using a specialized technique called the Addison  
7 Davies method.

8 For that last gasket where none were detected, that was  
9 one of Garlock's nonasbestos gaskets, one of their newer ones.  
10 Blue Guard was the name of the gasket. So we didn't expect to  
11 find -- we used it as a control.

12 Q. Why is that important?

13 MR. HARRIS: Excuse me, just a second, Your Honor.  
14 I object. I think Dr. Longo corrected this in his deposition.  
15 He did not find anthophyllite in the second gasket as  
16 mentioned there.

17 MR. FROST: We're going to talk about that in just a  
18 minute, Your Honor.

19 THE COURT: Okay.

20 BY MR. FROST:

21 Q. And Dr. Longo, what I've done is reproduce one of the  
22 tables from your study, correct?

23 A. Correct.

24 Q. And we were talking about the last sample, the  
25 asbestos-free. Why is it important to have a control like

1 that when you're doing these type of studies?

2 A. Well, it's always interesting to us to have something  
3 that you wouldn't expect -- we didn't really have any idea of  
4 what we would find in the chrysotile gaskets. But because  
5 there was no chrysotile in the Garlock Blue Guard gasket, and  
6 if our theory is correct that the source of the tremolite --  
7 source of the amphibole is from the chrysotile, then we  
8 shouldn't detect any in that particular gasket. So we ran a  
9 control. Plus we also run blank samples along with --

10 Q. Why is it important to do controls and blanks and things  
11 like that?

12 A. Just to make sure we're not introducing some confounding  
13 factor into the analysis. And we're looking at trace levels  
14 here, so we want to be careful that we're not causing  
15 something else to be in that.

16 Q. Now this Addison Davies method, is that something that's  
17 been published in the literature?

18 A. It was published in 1990. And it's based partly on the  
19 work that was done by others in the late '80s, dealing  
20 specifically with this issue of trying to determine if  
21 chrysotile has trace amounts of amphibole in it.

22 Under normal analysis that we all routinely use, you'll  
23 very rarely ever see any tremolite, actinolite, anthophyllite,  
24 what have you, because of the concentrations it's at. What  
25 the Addison Davies method does, is that it removes all the

1 chrysotile. Think of it as looking for some needles in a hay  
2 stack. If you remove the hay stack which is all the  
3 chrysotile, it allows you to take a look at and see -- so it  
4 increases your ability to detect trace levels. That's what  
5 the Addison Davies method was about.

6 Q. And is that a method that people like yourself use in the  
7 scientific community to try to figure out these questions of  
8 whether amphiboles are present?

9 A. Yes.

10 Q. Now, Mr. Harris was asking about the anthophyllite in  
11 that second sample. Can you explain what we're looking at  
12 there?

13 A. Well, in the second sample we reported both tremolite and  
14 anthophyllite. There is actually an original report there was  
15 one anthophyllite fiber. We went back and did a more thorough  
16 analysis of it, and came up with the amphibole percent.

17 In the deposition we looked at the original data, and the  
18 one anthophyllite fiber out of the many amphibole fibers that  
19 were found, was not present in that particular sample. So  
20 that was an error of putting that on there. The supporting  
21 data did not have anthophyllite. That does not change the  
22 amphibole percentage. But anthophyllite -- that one  
23 anthophyllite fiber should not have been put on that chart.

24 Q. So within your original report there was a chart, is  
25 basically this same chart. And what happened was when you

1 went to underlying data that sustains the chart,  
2 anthophyllite's not there but tremolite is?

3 A. Correct.

4 Q. Okay. Now Dr. Longo, how many reports do you think  
5 you've done over the years?

6 A. Thousands.

7 Q. Does anything in that taking anthophyllite out, does that  
8 change in any way that tremolite contamination or amphibole  
9 being present in that sample?

10 A. No. Not at all. Amphibole percent is 0.016. It's not  
11 based on that anthophyllite fiber. It was based on the full  
12 Addison Davies quantification analysis. Anthophyllite is one  
13 of the amphiboles that can be found in chrysotile deposits.  
14 But it does not change the overall results of that amphiboles  
15 were detected in that Garlock gasket at all.

16 Q. In fact, Dr. Longo, if I look through all your reports  
17 and look at all the data you collected, can I find typos and  
18 some other mistakes?

19 A. Yes, sir, you can.

20 Q. Does that mean that your studies are inconsistent or out  
21 of touch with what other people have done on these types of  
22 issues?

23 A. No, not at all. It doesn't affect the data whatsoever.

24 Q. Have you ever done a perfect study?

25 A. Not yet.

1 Q. Now, we were talking originally about asbestos fibers in  
2 one gram of a gasket. When we talk about these levels of  
3 amphiboles being present, is there any way for us to determine  
4 how much tremolite might be in a gram of gasket?

5 A. You can back-calculate using some assumptions from those  
6 concentrations. It obviously would be much less. Typically,  
7 if you back-calculate the concentration of the amphiboles in  
8 gasket materials typically runs between 100 and 150 million  
9 per gram.

10 Q. Now Dr. Longo, when you did these studies, you prepared a  
11 videotape that looked at what you were doing, correct?

12 A. Correct.

13 Q. And we brought an edited version of that videotape to  
14 show the court. There is a video where it went through every  
15 second from the time you walk in the chamber until the time  
16 you walk out. And then there are versions where we've cut it  
17 down so that it's not hours and hours of tape, correct?

18 A. Correct. The video -- the study we're going to look at  
19 is gasket four.

20 Q. Okay.

21 A. There was hundreds -- there was -- I can't remember  
22 exactly how many minutes, but it was over 100 to maybe 200  
23 minutes of videotape. But that wouldn't be it.

24 Q. Let's go ahead and show the --

25 THE COURT: Why don't we take a break before we get

1 into the videos.

2 MR. FROST: Yes, Your Honor.

3 THE COURT: It's been a while.

4 Let's take a break until 25 after.

5 (A brief recess was taken in the proceedings at  
6 11:13 a.m.)

7 (Court reconvened at 11:25 a.m.)

8 Q. Dr. Longo, I don't know what's happened, but during the  
9 break somehow we got these red arrows on everything. So the  
10 red arrows, that isn't something that when we watch the  
11 videotape that you guys added or anything, right? It looks  
12 like it's on my PowerPoint and everything?

13 A. It's gone now.

14 Q. Hey, it's gone. Perfect.

15 I can just tell you that Cameron my technical guy was  
16 just -- he had a sigh of relief at this point. He's recycling  
17 the computer, but let's talk about a couple things so we don't  
18 waste any time.

19 You've done, and we're actually going to view the study.  
20 You've done a number of different studies and they're known by  
21 the number of the study or the name of the product, correct?

22 A. Correct.

23 Q. And we have up there gasket study three, four, five, and  
24 the Crane Co. studies.

25 Generally, what have -- these work practices that we're

1 about to see, is this the same type of thing you've done in  
2 all these studies?

3 A. Yes. Not only for gaskets, but we probably have done at  
4 least 100 to 150 different studies on different products.

5 Q. Okay. Let's go to the video now -- hold on for just a  
6 second.

7 MR. FROST: Your Honor, there are a few things that  
8 Dr. Longo is going to have to show during the videotape. Is  
9 it okay if he comes down --

10 THE COURT: Sure.

11 THE WITNESS: Thank you, Your Honor.

12 MR. FROST: Make sure you face towards the court  
13 reporter. But if you can come down in an area where you can  
14 demonstrate what we're looking at.

15 Q. Okay. What are we looking at here, Dr. Longo?

16 A. We're looking at inside the ECL, and we have a work table  
17 in the middle. This is one of the flanges that we received  
18 from Dr. Gay where he had individuals cut the flange out of  
19 the steam system.

20 Here are the high intensity lighting that produces the  
21 Tyndall effect. So these are 750 to 1,000 watt bulbs that are  
22 turned on periodically to take a look at what's in the air  
23 during the activity. So here's the tools. And it's just  
24 about ready to start.

25 Q. Okay. Cameron, go ahead and start.

1 (Video playing.)

2 THE WITNESS: This is what the air inside -- can we  
3 freeze it for one minute? Just back it up a little bit.

4 The Tyndall lighting is on. We're looking at what's  
5 visible in the air before we get started. You can see --  
6 typically we see a few particulates, but it's nothing of any  
7 significance, before we get started.

8 Here the pipefitter is removing the bolts off the  
9 flange. This is -- the person doing this work activity was a  
10 retired pipefitter with over 30 years' experience. He also  
11 worked -- was a Navy boiler tender in the '60s. He was the  
12 one who did this particular work.

13 Q. Now so you used -- this isn't Bill Longo doing this work.  
14 This is a career pipefitter who's done this work in the field?

15 A. Yes, sir. This is study four. In studies, one, two and  
16 three I did the work. I'm not a pipefitter. Not a  
17 steamfitter. Never worked in the field removing gaskets or  
18 installing gaskets.

19 But for studies four, five and the Crane Co. study, we  
20 have this individual who had been doing this his whole career  
21 and is now retired.

22 Q. So the work practice that he's showing right now using  
23 the putty knife and the flanges, that's what the pipefitter,  
24 the man who did it for his whole life is doing, correct?

25 A. That's correct. The only instructions we gave

1 Mr. Holcomb was please remove the gaskets as you removed them  
2 in the field. We didn't give him any instructions on how he  
3 should do it, other than saying scrape these -- scrapers and  
4 wire brushes on these flanges.

5 Q. Go on.

6 A. Here's under the Tyndall lighting from just the scraping  
7 activity. Now you can see this dust concentration in this  
8 area. And that's -- and not in this area. That's because the  
9 light beam is culminated to, so it's got a low divergence.  
10 It's one of the things you have to understand is that this  
11 would be here too if we had light going through there. Again,  
12 he's scraping, he's using the putty knife to try to get off as  
13 much as he can off the flange before they -- as he said -- the  
14 activity was to remove as much as possible.

15 Again, using a hammer on the putty knife, that was his  
16 technique, not mine. But it seems to be a common technique  
17 that you see people use over and over and over.

18 Here's without the Tyndall lighting. This is what a  
19 worker would see. He would tell you that this is not a dusty  
20 operation. You can see a little bit of dust without Tyndall  
21 lighting here from the wire brushing. But then you can see  
22 what happens when you wire brush.

23 Now again as we talked earlier, this is not all asbestos.  
24 This is a mixture of composite, in my opinion, of the gasket.  
25 So the gaskets have 75 to 80 percent asbestos, I believe, and

1 that's -- would be the concentration by weight in air.

2 Here's without Tyndall lighting. Again, it answers some  
3 of the questions we had early on, why didn't people ask for  
4 masks. When they said it wasn't dusty, was it in fact really  
5 dusty and they couldn't see it. So it was a very valuable  
6 tool for us to try to understand these exposures.

7 Here's a gasket in a flange that's been opened. Here  
8 he's trying -- he's getting under the flange. This is a ring  
9 gasket flange which is in this particular case. And I think  
10 that might have been the nonasbestos gasket. But it still  
11 left a residue that he's scraping. So they always try to lift  
12 it off if they can. Again, he's wire brushing.

13 Q. So the amount of force he's using, this is what  
14 pipefitter's doing, not what Bill Longo told him to do?

15 A. No. I was -- here he's cutting the edges off so he  
16 can -- and these gaskets would lift off. A lot of these were  
17 serrated edges -- I mean serrated finishes.

18 And again, I think in this particular study we did four  
19 or five hand wire brushing. That's probably good enough. We  
20 can move on to save time.

21 Q. Okay.

22 A. Go to the next part.

23 Q. Can you move forward to the --

24 A. There's a lead in. This is probably the last flange we  
25 did.

1           Again, lifting off the gasket. Again, you can see how  
2 tightly adhered it is. These flange surfaces have  
3 phonographic serrated edges, which are essentially about tenth  
4 to a half millimeter. You can't get the gasket out of those  
5 edges, because the gasket seats and flows into it under  
6 high -- under elevated pressure and temperature. It's just --  
7 it's not possible to just lift it off and scrape it all off  
8 with a putty knife.

9       Q. Now one of the criticisms I heard was something about the  
10 fact that these serrated edges that somehow doing this type of  
11 work that the pipefitter is doing that would somehow damage  
12 these valves. Is that something you found?

13      A. Again, we didn't see that damage. This is -- this again  
14 is a pipefitter doing this work. This is the same type of  
15 tools that pipefitters and steamfitters have testified years  
16 and years, read hundreds of these depositions. It's the same  
17 tools. I don't see the damage that's been reported that might  
18 happen. Again, they stick so hard these particular set of  
19 materials, the gaskets rip in half.

20      Q. When we see that fibrous material, what are we looking at  
21 there?

22      A. Those are very large chrysotile bundles.

23      Q. Now there's been some criticism, Dr. Longo, that during  
24 some of these tests, maybe some of the pumps may have  
25 flickered. Are you aware of any pumps failing during this

1 particular test?

2 A. In this particular test, no. We've had pumps fail or the  
3 filter is damaged, we don't report the results. Now it's not  
4 uncommon for these helium pumps to flicker red if the tubing  
5 gets bent a little bit from the movement. Flickering red is  
6 not the pump that has failed. If it continues to do that  
7 flicker it will go red and fail.

8 Q. Now we have the wire brushing.

9 A. Here again the gasket is being lifted off. He's lifting  
10 off as much as he can. He's scraping off as much as he can  
11 off the flange face. They have to do this before they put a  
12 grinder to the flange face. If you don't scrape off all the  
13 big pieces, when you put the grinder to the surface, the  
14 pieces will fly out. So you always scrape the surface to get  
15 everything off you can.

16 Now here's a grinder. More energy input. So the grinder  
17 is going to cause dustier levels. The grinding activity  
18 typically produces higher results than the hand wire brushing  
19 activity.

20 Q. Is that a surprise?

21 A. No, it's not a surprise. Once -- it's like sanding wood.  
22 But again there's all -- there's different factors that affect  
23 the concentrations. It's not just the fact that you're using  
24 a grinder versus a wire brush. The primary factor is how much  
25 of the gasket residue is left on the flange. That changes

1 each and every time. You can have a little bit of gasket  
2 stuck on a flange and use a grinder and the results are lower,  
3 than if you have a lot stuck on the flange and you're using a  
4 wire brush for extended period of time.

5 Q. Now we talked about -- there was some question about  
6 whether one of the pumps had failed and whether it flickered  
7 or not. Is there anything from your report that you've seen  
8 where any of those pumps failed during this particular test?

9 A. Not in this particular test that I recall. I think if  
10 there's a pump in question, there was actually results, and in  
11 each set of data, each individual has two pumps. So if one  
12 pump fails, then the results of that one pump should be  
13 completely different, way different than the other results.  
14 So again it's not unusual to see them flicker from time to  
15 time. It's when it goes red that they shut off.

16 Q. Now there also was a discussion about the fact that you  
17 guys used a wire brush that had a guard on it. Have you seen  
18 that?

19 A. Yes.

20 Q. Okay.

21 A. Electric wire brush.

22 Q. Okay. Cameron pull up the video of the wire brush.

23 Now when you very first started the test, how was the  
24 wire brush -- what type was it and what was installed on it?

25 A. It was a steel wire brush that was installed on a

1 grinder. And the grinder had a shield on it around the wire  
2 brush, and became very apparent that the shield was  
3 interfering with the movement of the wire brush.

4 Q. And Dr. Longo, we pulled a section of the videotape where  
5 it's the grinder not even touching the flange, and what do we  
6 see?

7 A. Well, you can see sparks coming from the grinder itself.  
8 If you look at the grinding of the flange, it looks like the  
9 flange itself is sparking.

10 Q. Go back again, Cameron. I'm not sure.

11 A. Which happens sometimes with the wire brush when they hit  
12 the bare metal. But what's really happening is that, as you  
13 see right there, is the wire brush is hitting the inside  
14 steel, and eventually that caused the grinder to burn down.

15 The grinders used after this, the shield was taken off.

16 Q. Okay. So in the first one when the grinder blew up,  
17 which was one of the other criticisms I heard, it was using  
18 that shield and problem was is the shield was creating a  
19 problem with the wire brush to begin with, without being on  
20 the flange.

21 A. Correct. Because the wire brush expands out because the  
22 flexible nature of it. The burnout of the actual grinder was  
23 not due to the pressure on the flange at all, it was due to  
24 the fact that it was being interfered with the guard.

25 So it was not because it was being pressed down as far as

1 it can on the flange. You can see the sparks were from the  
2 actual guard. That never happened again after we removed the  
3 guard.

4 Q. Okay. And again, who's doing that work practice?

5 A. Again, this is Dean Holcomb doing this work.

6 Q. The pipefitter?

7 A. Yes.

8 Q. I think you can resume your seat. Switch over. Okay.

9 So we've looked at the videotape and that was for gasket  
10 four, correct?

11 A. Yes, sir.

12 Q. And we have a chart up there that has the different  
13 ranges and average of the different studies.

14 Can you tell us what's the significance of sort of where  
15 we are in those ranges and how it applies to the studies that  
16 you've done over the past?

17 A. These are the four grinding studies. Study three was an  
18 electric drill that was a Skil .3 horsepower electric drill,  
19 had an RPM of 1,350 I believe.

20 Studies 4 and 5 and Crane Co. grinder were an angle arm  
21 grinder, RPM in the 10 to 11,000 range, much higher RPM. I  
22 think what is interesting here, is the lower RPM electric  
23 drill, 15 to 31 fibers per cc, are consistent with the other  
24 flange gasket studies, even though we were using a very  
25 high-powered -- much more higher RPM grinder. So it didn't

1 seem to be that the effect of the RPM was what was influencing  
2 the results, other than it was a higher -- let me back up.

3       Since the electric drill is at 1,350 RPM, the grinders  
4 used in 4, 5, and Crane Co. were approximately 11,000 RPM. We  
5 don't see a significant difference between using electric  
6 drill at 1,350. We have some of the upper ranges are very  
7 close to the others. The average is higher than gasket four,  
8 but lower than gasket five and Crane Co., but in that same  
9 range. Doesn't seem that the RPM of the grinder produces any  
10 additional bias or effect from the overall results.

11 Q.   And so what -- based on your studies when we're dealing  
12 with flange gasket removal using a power wire brush, what  
13 types of ranges and fibers per cc are we talking about have  
14 been found in your studies?

15 A.   The ranges we see here for power wire brushing for our  
16 studies. We've had a range from -- gasket four from four  
17 fibers per cc, to the grinder study on five, the 36.8 fibers  
18 per cc, which was higher than the rest of the studies, and is  
19 an unusual result for that, for that grinder study, because of  
20 the 36.8.

21 Q.   What explains that unusual result there?

22 A.   Well, what, during the study, in gasket study five, the  
23 first four air samples were worn by Mr. Holcomb and  
24 Mr. Hatfield. They neglected to turn the pumps on during the  
25 first 10 or 15 minutes of the studies. When they went to

1 change out the air filters, they found that they hadn't turned  
2 the pumps on. They changed out the air filter. They turned  
3 them on and then took the -- during the rest period, and then  
4 went on to do the study. Those were the highest results. The  
5 highest results found was not during the actual work activity.

6 The area samples taken during the work activity were  
7 pretty much the same we've seen, but much lower than that.

8 We sent those air samples off to an independent  
9 laboratory. Those are the results that they found. We  
10 confirmed the results using the 7402 analysis. So that  
11 concentration is on those filters.

12 And I guess -- and it's the only -- out of all the sets  
13 of samples, it's the only ones we ever took during the rest  
14 period. So we can't say exactly why it's higher, other than  
15 the area -- the work area -- the actual during the work must  
16 have been much higher. But it's the reason we take air  
17 samples. We can't predict these results.

18 Asbestos is not a gas. Asbestos fibers, especially using  
19 tools, you can get different concentrations. And we haven't  
20 done enough rest period samples to try to understand what  
21 happened in this one particular set of samples.

22 So that grinder five for the four air samples out of the  
23 70 to 80 air samples that were taken in that particular study,  
24 are somewhat different than the -- are different than the rest  
25 of the studies -- rest of the air samples taken.

1 Q. So what happened was, is that the 36.8, prior to that  
2 sampling being done during the rest period when nothing's  
3 going on. There had been work activities being done, it's  
4 just those stopped, they figured out they hadn't changed the  
5 pumps. They start the pumps while they're resting, and those  
6 are those numbers from that --

7 A. Correct.

8 Q. -- before the work practice?

9 A. I mean, the pumps weren't running, but they were grinding  
10 off a large gasket on a flange.

11 Q. Okay. So it wasn't like they just walked in the room  
12 turned on everything and that was the number they got?

13 A. No. No. It was taken during the rest period. And out  
14 of the 500-some-odd air samples we've taken during all these  
15 difficult studies, I don't believe this is the only set taken  
16 during the rest period. We don't have enough data to  
17 understand why these particular numbers are what they are.

18 Q. How many total numbers of samples have you taken in these  
19 various gasket studies over the years?

20 A. Just in gasket studies alone, I think the number exceeds  
21 something in the area of 4- to 500 air samples. So it's  
22 somewhere in that area, quite a bit.

23 Q. And when we talk about those 4- to 500 air samples that  
24 you've taken, how many different data points are there that  
25 you've been able to look at based on those 4- to 500 samples?

1 A. Well, I went through and spent time looking at all the  
2 data points for gasket studies two, three, four and five, not  
3 the Crane Co. And in looking at all the individual data  
4 points, looking at all the individual entries, all the  
5 recording for everything that was done, I came up with an  
6 estimate of a little bit over 50,000 individual data points  
7 from the charts, to the recordings, to the actual analysis, to  
8 the individual fiber analysis, everything.

9 So if you were to put the Crane Co. study in, which is  
10 just about as large as all those studies, you know, it's going  
11 to be somewhere in the 70 to 100,000 individual data points.

12 Q. And Dr. Longo, based on your studies, if an individual  
13 was doing the fabrication of asbestos-containing gaskets,  
14 doing the typical work practices back in the 1950s, '60s,  
15 '70s, during those timeframe using those typical work  
16 practices and things that you've studied, would those  
17 individuals be potentially exposed to asbestos in excess of  
18 that background level we talked about earlier?

19 A. Yes, they would.

20 Q. And when we talk about not using the power wire brushing,  
21 but taking the flange, opening it up, cleaning it with a putty  
22 knife, and then taking a wire brush by hand, would that have  
23 potential for individuals to be exposed to above background  
24 doing that work practice?

25 A. Yes, sir. I don't remember if I saw the slide, but there

1 is -- was a slide on the concentrations of just scraping and  
2 wire brushing.

3 If you look at all our studies, the ranges of scraping  
4 and wire brushing on flange gaskets was approximately 0.4  
5 fibers per cc for gaskets that just fell off pretty easily and  
6 only had a small amount of wire brushing that was required, to  
7 a very large flange that the gasket was adhered very tightly  
8 up to, I think it's 20 to 21 fibers per cc.

9 If you were to average all that out, the range of  
10 exposures for wire brushing on the order of about two to four  
11 fibers per cc. So much lower than the ranges you see for the  
12 power wire brushing.

13 Q. And again, if we're doing -- if an individual was doing  
14 power wire brushing of an asbestos-containing gasket, would  
15 those individuals have potential to be exposed asbestos above  
16 that background level during that work practice?

17 A. Yes, sir. Be my opinion that if you have to grind  
18 residue off a flange surface, asbestos-containing residue to  
19 any degree, you will be above background levels.

20 Q. What would that range be based on your studies?

21 A. On our studies we've seen the range where you -- of .3  
22 to .4 up to 21 fibers per cc.

23 In fact, if a gasket just falls off, the range can be  
24 very low. It's all about how the gasket sticks, and how much  
25 of the material has to be removed, if any.

1           If a gasket comes out intact, and there's little to no  
2 residue on the flange, I wouldn't expect to see very  
3 significant results at all from the actual wire brushing or  
4 using a grinder to polish -- polish the flange surface.

5   Q.   Now Dr. Longo, one of the things we've heard in this  
6 trial was somehow Dr. Longo's results have not been  
7 replicated. In fact I think someone said even you can't  
8 replicate these results. Is that a fair criticism?

9   A.   No, that's not fair at all. The ranges of exposures for  
10 different types of activity, power wire brushing, is in the  
11 same averages that we're seeing. What I said in my report  
12 was, that I would expect if you're power wire brushing off  
13 material off a flange, that typically you would be exposed to  
14 fibers greater than 10 fibers per cc. Every one of our  
15 studies show that.

16           But you have so many variables on a flange. It's very  
17 hard to take a flange from the source, remove the gasket. And  
18 if the gasket adheres to the flange to any degree, you say,  
19 okay. I'm going to get these same studies over and over --  
20 same results over and over again. It's impossible. The  
21 reason is, there's so many variables.

22           The size of the flange. Is this a 2-inch pipe or a  
23 10-inch pipe. The size of that flange, is it a full-face  
24 flange where it covers the bolt holes or is it a ring  
25 flange -- excuse me, a full face gasket that covers the flange

1 where the entire inside of the flange has a gasket material on  
2 it, or is it a ring gasket that is on a raised flange. Is it  
3 a serrated or phonographic surface versus a flat surface. Is  
4 the gasket a 1/32nd of an inch, 1/16th of an inch, or 1/8th of  
5 an inch. How long has the gasket been in place? What  
6 temperature has it been under? These are all variables  
7 unknown.

8       The only way you can do something is to take in test  
9 procedure, take a flange, put a gasket in it, put it in a  
10 steam system, everything the same, same person doing the work,  
11 and your results would probably be almost on top of each  
12 other. But to say these results are not reproducible, I think  
13 is unfair.

14       What our results have shown is that repeatedly that we  
15 get these same magnitude of results, and it all depends on the  
16 gasket. I've always said this a lot of times. Not one study  
17 from any individual can replicate every condition ever  
18 experienced by a pipefitter, steamfitter, what have you,  
19 because of all these variables.

20       You're going to have in some cases where the gaskets just  
21 fall off. Those are -- exposures are going to be very low.  
22 In other cases you have gaskets that adhere like ours did in  
23 some of these where they split. Those exposures, depending on  
24 the tools, will be very significant. And you can have  
25 everything in between.

1           There's no one study that can say, this is what happens  
2 to everybody. This is -- some are going to be very low  
3 exposures. Some are going to be somewhat significant, and  
4 some will be very significant.

5 Q.   Now there was some discussion with Mr. Boelter, and  
6 that's a still from the video that we looked at, correct?

7 A.   Yes, sir.

8 Q.   Okay. That's using the Tyndall lighting?

9 A.   Correct.

10 Q.   Now, there was some discussion with Mr. Boelter about the  
11 Cheng and McDermott study the one Chevron Corporation did and  
12 was published in the literature in 1991. You're aware of that  
13 study, correct?

14 A.   I am.

15 Q.   There's a table, I guess I should have blown it out  
16 better. But it has dry removal of gaskets and valve gaskets,  
17 and it has the samples and it has concentrations. Are you  
18 able to read that on the screen that you have?

19 A.   I can.

20 Q.   Okay. How do those concentrations compare with the  
21 studies that you've done?

22 A.   They're at the lower end of our work. We have studies  
23 of .3, .41, one to two, two fibers per cc on some of the  
24 gaskets that didn't adhere very tightly. So these results  
25 are -- let's see, two valve gaskets .1. Our results -- our

1 lower end results are .3 to .4 on up. We don't have results  
2 as low as .1 to .2.

3 Q. Are they statistically -- I won't say statistically  
4 significant. But is there any real huge significance here  
5 that these here are a little lower?

6 A. No. They're all significantly above background. They're  
7 all less than one fiber per cc. Because of the sampling and  
8 because of the size, it's not unusual even on the same person  
9 to have air cassettes that are double from one side to the  
10 other, depending on which side is facing the flange, et  
11 cetera.

12 Q. And is it uncommon for labs to do a test and do it in a  
13 certain way, then replicate the test again and come out with  
14 different numbers?

15 A. No, it's not uncommon at all.

16 Q. Why does that happen when we're talking about asbestos  
17 and this type of work?

18 A. Well, you got to remember, asbestos is not a gas and  
19 there's a human being doing the counting. So it's not  
20 unusual, that's why for round robins they give such a big  
21 spread for what's considered okay to pass. Nobody has ever  
22 had a round robin where all the labs come up with exact same  
23 number. There's always a whole range. Then they look at that  
24 range and they decide what is acceptable. That concentration  
25 from .1 to .3 for a round robin would have been acceptable for

1 the same air samples.

2 Q. So those would have been acceptable and within what you  
3 would expect based on both work?

4 A. Correct. Say the sample that was sent around was  
5 actually .3 or .2. If every lab in the country gave a result  
6 that was between the .1 and the .3, the results would be so  
7 narrow that those all would have been accepted as passing the  
8 round robin.

9 Q. Now you're aware Dr. Millette's also done some studies on  
10 asbestos-containing gaskets?

11 A. Yes.

12 Q. This was published in the EIA technical journal in 1995.  
13 That's something you're familiar with, correct?

14 A. I am.

15 Q. We talked with Mr. Boelter about this, but they actually  
16 during that test, they used masks and respiratory protection,  
17 correct?

18 A. Correct.

19 Q. When you did your test, did you use mask or respiratory  
20 protection?

21 A. Yes, absolutely.

22 Q. Why?

23 A. Well one, we don't know what the results are going to be.  
24 So out of prudence, and unless you absolutely know the results  
25 for those particular workers and that particular work site,

1 you have to have a respirator. Number one, to me it's common  
2 sense. And number two, it's an OSHA requirement.

3 Q. And in fact, were there not some gaskets that were made  
4 out of crocidolite?

5 A. Yes, for specialty occasions, such as acids where normal  
6 chrysotile gaskets will not hold up.

7 Q. Are you aware that Garlock made some of those gaskets?

8 A. Yes, sir, I am aware of that.

9 Q. Now, Mr. Millette published also some of his studies and  
10 we're talking about power wire brushing, and we're talking  
11 about this issue of whether Dr. Longo was out of the norm.  
12 These were his numbers. How do your numbers relate to those  
13 for power wire brushings?

14 A. We've had sets of air samples done in that range for  
15 power wire brushing. Again, it just all depends on what the  
16 gasket is like that you're dealing with. So that's almost 6.8  
17 fibers per cc in our gasket four study. We had a set of air  
18 samples four to seven fibers per cc.

19 For hand scraping and power wire brushing, they have 2.1.  
20 We have recent studies that show two, two and a half fibers  
21 per cc.

22 So it's not so much that we can't reproduce each other,  
23 the problem is what we're starting with is different from  
24 every lab that looks at the valves. You can't -- you're  
25 taking valves out of the system that over the years have had

1 different temperatures, different pressures. When was the  
2 last time the gasket was put in. You don't have any  
3 consistency on what we're getting to test. So you can look at  
4 trends.

5 Scraping and wire brushing, you're going to have lower  
6 levels typically than -- we found than power wire brushing or  
7 power grinding. And the results are in these ranges. These  
8 are some of the lower end results that we found, but they're  
9 in the ranges that we found.

10 Q. And so when we're talking about whether your results  
11 could be replicated or other people have found those types of  
12 things, we didn't talk about the hand scraping and power wire  
13 brushing. They're different numbers for the different  
14 activities and that -- those are consistent with your numbers?

15 A. Correct. Now scraping and power wire brushing shouldn't  
16 be that much different than just power wire brushing. But if  
17 you're dealing with a flange that the gasket would adhere to  
18 the flange after the bulk of the gasket been removed much  
19 less, you're going to have much less, even if you do that same  
20 technique over and over again.

21 Q. Now I think there was some discussion with one of the  
22 earlier witnesses, I think it was Mr. Liukonen, about the TEM  
23 results. And I think he indicated that he didn't think the  
24 TEM results could be higher than the PCM results, is that  
25 true?

1 A. No, that's not true.

2 Q. Can you explain that to us, why it's not?

3 A. Well, the TEM analysis that Dr. Millette has done here,  
4 is a standard structures per cc analysis of asbestos fibers,  
5 the PCM is in fibers per cc.

6 The PCM, because it's an optical microscope at a  
7 magnification of 430 times, only can see the very biggest  
8 bundles of chrysotiles. So the fiber has to be longer than  
9 five micrometers in length, and wider than .2 to .25  
10 micrometers in width.

11 No chrysotile fiber that has been mined out of the ground  
12 anywhere in the world, has widths of that size. So what  
13 you're looking at is bundles.

14 Now that size of bundle or fiber is a very small fraction  
15 compared to all the asbestos that's present. Asbestos fibers  
16 that are less than five micrometers would not be counted by  
17 PCM.

18 Single asbestos chrysotile fibers that are less than .2  
19 micrometers wide, would not be counted by TEM.

20 So the TEM results where you're counting all the asbestos  
21 present is always going to be higher, typically. And the  
22 numbers floated around depends on the product, but it's  
23 usually anywhere from 10 to 20 to 30 times higher, in that  
24 range.

25 So it's not surprising at all that all the TEM results

1 are much higher than the PCM, because you're looking at all  
2 the asbestos fibers, not just the very biggest ones.

3 Q. So the TEM method itself, even though it's doing  
4 structures per cc, the reason you're using that is that it's a  
5 more precise method and it's going to see more?

6 A. Correct. It's looking -- I don't get in the argument  
7 what's important in health. But that's what's really in the  
8 air when you're doing TEM analysis. It's giving you a  
9 snapshot of all the size fibers.

10 Q. I think that's what Mr. Millette wrote in his article.  
11 He talks about the TEM and the analysis of those sheet gaskets  
12 which he said were 80 percent; is that correct?

13 A. That's correct.

14 Q. Now he also talked about this issue of friability, and  
15 says that "asbestos sheet gaskets, although not considered  
16 friable in original unused condition, can release asbestos  
17 fibers into the air during various operations when hand  
18 methods are used, and especially when power tools are  
19 involved. Clean-up following cutting of new gaskets and  
20 removal of after-service gaskets may be suspended as  
21 dust-containing asbestos into the air." That's that  
22 re-entrainment that we talked about, correct?

23 A. Yes, sir.

24 Q. That's if someone had done valve work and blew it out  
25 with air and someone swept it up afterwards, that type of

1 thing?

2 A. Yes. He showed in his study the levels were -- what we  
3 found in a lot of our work, not just gaskets, thermal  
4 insulation studies, brake studies, that the clean-up typically  
5 can be as high as the actual exposure during the work.

6 So the finding of 5.5 fibers per cc, which is almost  
7 as -- higher than the hand scraping and power wire brushing,  
8 but lower than the power -- just power wire brushing, is  
9 consistent with all asbestos products across the board where  
10 the clean-up can be as high as the actual use of the product.

11 Q. And I think that -- now -- and then this is your study.  
12 But then have there been other people who looked at the same  
13 types of things. We have the IHF study from 1978. Are you  
14 familiar with that?

15 A. I am.

16 Q. What's the significance of that type of study and who was  
17 it done for?

18 A. This was done for Garlock, and it's the removing a gasket  
19 from a flange, and the significance of it is it's 4.58 fibers  
20 per cc. They don't state that they were using hand wire  
21 brushing or grinding. But it does show very significant level  
22 of exposure, and is in the range of some of our -- both our --  
23 almost the average of our hand wire brushing studies, and one  
24 of the lower-end samples for power grinding.

25 Q. Now, this study done by the Industrial Hygiene

1 Foundation, it's in 1978 for Garlock, are you aware of that  
2 ever being published in the peer-reviewed literature?

3 A. No, sir. You typically don't see these types of studies  
4 in the peer-review literature. Every now and then like  
5 Chevron allowed that to be published, but it's somewhat rare.

6 Q. So the study that was done for Garlock using Garlock  
7 materials, is that consistent in the ranges that you and I  
8 have been talking about?

9 A. Yes, sir.

10 Q. Now you're familiar with the Shell study from 2005?

11 A. I am.

12 Q. And we're again talking about this issue of whether your  
13 research is consistent with not only what's been  
14 peer-reviewed, but what's going on in industry. What can we  
15 learn from the Shell study?

16 A. The Shell study, it was a Durabla gasket. And they tried  
17 two techniques to remove the gasket -- asbestos-containing  
18 gasket. One, they used a grinder, like an angle grinder, I  
19 believe it was a grinder. And they recorded results 28.4  
20 fibers per cc, that was in the range of our grinding studies.

21 Then they tried something unique that I've not ever seen  
22 before. They did the study again where they used an acetylene  
23 torch to burn the gasket off, to see if they could reduce  
24 fiber levels. It was the first time I've ever seen that  
25 anywhere.

1 Q. I think I misspoke. It says 2005, it's actually 1985,  
2 correct?

3 A. Oh, I didn't even catch that. You are correct.

4 Q. It was a late night last night.

5 A. Sorry. I should have caught that.

6 Q. But that's from 1985, correct?

7 A. Yes, sir.

8 Q. Now you were talking about the burning of the gasket that  
9 you've never seen before. Any significance to that when we're  
10 talking about potential exposures to asbestos?

11 A. Well, when they removed the gasket from a flange using  
12 acetylene torch, they actually got much lower results, like  
13 0.5 fibers per cc. So it showed that -- but I don't think  
14 that was very practical in the industrial world or on a Navy  
15 ship.

16 Q. Now, are you aware of this Newport News study again in  
17 1982?

18 A. Yes.

19 Q. And what's the significance of that particular study?  
20 We're looking at the first portion where it says "removing  
21 asbestos gaskets from steam valves with power tools"?

22 A. What's significant here is that the study is interesting  
23 in that they opened the valves -- they opened the flanges,  
24 then soaked them with rags with water for 24 hours. They did  
25 this in an enclosure, but they did it right in front of a

1 ventilation hood. They first did work, then they used a  
2 needle gun to get the bulk of the asbestos off the gaskets --  
3 I mean off the flanges. Then they used a power grinder to  
4 remove the residue.

5       They had a peak exposure of 29 fibers per cc. Then they  
6 had two samples that were too overloaded to count. If you're  
7 looking at overloaded samples to count, at least I have always  
8 made the assumption, if you have a series of samples and two  
9 of them are overloaded, but you can still count the sample  
10 that has 29 fibers per cc on it, then the overloaded sample  
11 has to be at least that high or higher. It has to be. You  
12 can't have a lower air sample with the same product, the same  
13 material, the same tools, except you're using a needle gun,  
14 and be overloaded and be at lower concentrations.

15 Q. I don't think we talked about what an overloaded sample  
16 is, what's that?

17 A. Overloaded sample is it has too much fiber in particular  
18 to count. Think of it as a plate of spaghetti. If you got a  
19 bowl of spaghetti, it's impossible to tell you other than  
20 there's a lot to tell you how much strands are in there. If  
21 you spread that spaghetti out, or you reduce the amount of  
22 spaghetti you put in the bowl, than you can more likely count.  
23 So an overload is just too much material there to actually  
24 analyze.

25 Q. Let's say I have an overloaded sample. Can I take that

1 overloaded sample and then try to do some statistical analysis  
2 to it to try to figure out how much asbestos was really there?

3 A. No.

4 Q. Why not?

5 A. You can, but it's not allowed.

6 Q. It's not allowed?

7 A. No. If you have an overloaded sample and you're trying  
8 to determine OSHA compliance, what OSHA tells you to do, you  
9 got to do it again. And that's in a work study work place.  
10 When you do these work practice studies, you're not dealing  
11 with OSHA compliance, at least we weren't because we're  
12 wearing respirators. So we usually have a one-of-a-kind  
13 sample, we can't go back. So we try our best not to overload.

14 Q. Now again, what were the results of that Newport News  
15 study with that grinding?

16 A. Well the grinding showed levels of between 10 and 29  
17 fibers per cc, if that is the grinding part. The needle gun  
18 part, I believe it was the one was overloaded, we have to look  
19 at the individual air samples.

20 Q. And then there was some discussion about what actually  
21 happened before the needle grinding. Have you looked at what  
22 was going on in the very beginning of this study?

23 A. Yes, sir. Talked with Mr. Harris about this in my  
24 deposition. The -- if you go back and look at -- if you go to  
25 the -- no, you can leave it there.

1           We have a set of samples that -- oops -- you know what,  
2 did I do that? I touched the screen.

3 Q.    That's what it was?

4 A.    I did do it.

5 Q.    You're the culprit.

6 A.    I'm so sorry.

7 Q.    That's okay.

8 A.    I didn't realize this was a touch screen.

9 Q.    I think you're the first person to touch the screen  
10 because we haven't seen that yet.

11       Okay. So you were --

12 A.    If you look at -- if you can see it -- it's kind of hard  
13 to see. All right. The lower right-hand corner goes through  
14 and tells what happened at different times.

15 Q.    You mean this area right here?

16 A.    Right. So from seven to nine they set up and put on the  
17 clothing and set up the study.

18 Q.    Right. It says, set up of area and looks like donning of  
19 PP --

20 A.    I think that's personal protection clothing.

21 Q.    -- clothing. Okay.

22 A.    From 9:40 to 10:00, and actually it was from 9:40 to  
23 9:58. For 18 minutes they went into the area and began work.  
24 There's no description of what beginning work means. Now the  
25 flanges were already opened. The flanges were in front of --

1 in front of the air hood. So either two things happened.  
2 Either the individual entered and for 18 minutes just stood  
3 there, or for 18 minutes they did work.

4 Now the common technique of removing gaskets is to start  
5 off with a putty knife and material to remove much of the bulk  
6 material as possible.

7 He went out -- out of the room from 10:00 to 10:30 and  
8 obtained a needle gun, and then went back in and entered and  
9 removed the gaskets.

10 So we have a reading there of 5.8 fibers per cc during  
11 that 18 minutes when he said he began work. We don't have a  
12 good description of what "began work" is. It doesn't seem  
13 sensible to me that the individual said where they began work  
14 just stood there for 18 minutes and did nothing. So -- but I  
15 don't have a good description of that.

16 But it would fit the criteria of what machinists and  
17 pipefitters do is, before you use a power tool on these  
18 gaskets, you have to remove all the -- much material as  
19 possible. Because the power grinder lifts the large pieces  
20 that can be removed, will actually fling that material on the  
21 grinder. At least that's what the pipefitters and  
22 steamfitters tell me.

23 Q. So basically that 284, that's that time period at the  
24 very beginning --

25 A. The 18 minutes.

1 Q. The 18 minutes. That's the sampling that's done. We're  
2 not sure exactly what was going on. We know that opening up  
3 the flange and testing, that's what they got?

4 A. Well, they had already opened the flanges. The flanges,  
5 if you read the study, so he said they began work. What work  
6 did they do if the flange is already open? If it's sitting in  
7 front of the hood, you know, my thought is, is that what  
8 they're doing is doing the scraping portion of it.

9 Now, when we get to the power tools, we can see how that  
10 increases for the residue material. The needle gun looks like  
11 it was way too heavy, and then we have the additional samples  
12 that were done.

13 Q. If that 5.8 is when they're doing scraping, is that  
14 consistent with the scraping type studies that you've done?

15 A. Well, whenever we've done scraping by itself, we've never  
16 done scraping and removal by itself. There you have a large  
17 number of flanges they were working on here. But again, I  
18 don't have a great description of it. But I don't believe  
19 when they said they began work that they just did nothing and  
20 that was the background air sample concentrations.

21 Q. Now, in addition, are you familiar with Dow Chemical  
22 doing a study of gaskets?

23 A. Yes.

24 Q. And just briefly, how does that fit into this realm of  
25 your studies?

1 A. The grinding study was, they found levels of 18 fibers  
2 per cc, which is in the range of what we found.

3 Q. Now Dr. Longo, you are familiar with other people who  
4 have done similar types of studies in the past, like  
5 Mr. Boelter and Mr. Mangold, correct?

6 A. Yes, sir.

7 Q. Have you actually reviewed their videotapes in the  
8 context of litigation involving Garlock in the past? Because  
9 you have testified for a number of years, correct?

10 A. Yes, sir, I have.

11 Q. I have up on the screen, a split screen. Is this  
12 something you've seen on the past?

13 A. Yes, sir, I have.

14 Q. On the right-hand side it says, MAS. On the left-hand  
15 side, what is that?

16 A. That's Mr. Mangold during his gasket removal study. I'm  
17 the one who put this together so I'm familiar with it.

18 Q. Okay. So this particular video that we have is basically  
19 a side-by-side of your study, and then Mr. Mangold's study,  
20 and then a little bit later Mr. Boelter's study, correct?

21 A. Correct. This is some of the work activity that  
22 Mr. Mangold did when he was removing a gasket. And it was  
23 compared -- I wanted to compare it to our study. So initially  
24 when we got our results, it was clear to us in the early years  
25 that Mangold and Boelter hadn't published their work yet, but

1 I was familiar with it, because I had seen the results. That  
2 our results were 180 degrees different from theirs. Ours were  
3 much higher. I was trying to understand why. These  
4 videotapes helped understand why there could be such a  
5 difference between their work and ours.

6 Q. So if I show these to someone later in the trial, what's  
7 going on on the right-hand side is your testing. What's going  
8 on on the left-hand side is Mr. Mangold and Mr. Boelter's test  
9 that you've seen?

10 A. Yes.

11 Q. Okay. Now I want to talk to you about another issue,  
12 just very briefly is -- there's been a lot of discussion about  
13 what you do as being junk science and that there was a court  
14 in Lamar County that excluded some of your testimony. Are you  
15 familiar with that?

16 A. Yes, sir. To be fair, excluded all my testimony.

17 Q. And there's been some allegations that basically --  
18 you -- they call it junk science, I guess. Have you heard  
19 that in the past?

20 A. Yes. The judge actually in that order called it junk  
21 science, so that's where they get that from.

22 Q. Now immediately after that order, have you been deposed  
23 on your studies in the past?

24 A. Yes.

25 Q. Have you been deposed over many hours and many days over

1 your gasket studies, things like that?

2 A. I can't imagine how many hours I've been -- sat  
3 through -- I've been deposed on our gasket studies.

4 Q. And I know you and I have sat through a few of them. But  
5 after the Lamar County Order, was there a Texas MDL concerning  
6 asbestos organized?

7 A. Yes, there was.

8 Q. Has this issue of whether your studies are allowed in the  
9 State of Texas been dealt with by the asbestos MDL judge?

10 A. Yes, sir. Judge Davidson, when he took over the MDL, he  
11 was the gatekeeper for all the trials happening in Texas. As  
12 you can imagine, the Lamar County Order came up immediately  
13 with my studies.

14 Q. And subsequent to that, have you been allowed to testify  
15 and use your studies in the State of Texas in the asbestos  
16 MDL?

17 A. Yes. The MDL judge ruled that the defendants couldn't  
18 use the Lamar County hearing decision in any case in Texas.

19 Q. Now, in fact, after that Lamar County Order, I want to  
20 make sure I get the timing right. When was your study  
21 actually published in the peer-reviewed literature?

22 A. It was published in January of 2002.

23 Q. After the Lamar County Order?

24 A. The Lamar County Order came out on July 5th,  
25 approximately 4:00 p.m.

1 Q. A day you remember well, I guess?

2 A. Yes, sir.

3 Q. Now, what defendant was involved in that case and what  
4 law firm was involved in that hearing?

5 A. The hearing was in RE. But the attorneys representing  
6 Garlock, Mr. Ray Harris was involved in that hearing.

7 Q. And so the Lamar County part of that was Garlock's  
8 challenges to your gasket studies, and some of the same issues  
9 I'm sure we'll hear about this afternoon, were some of the  
10 same issues that were brought up in that study -- in those  
11 hearings, correct?

12 A. Yes, sir. They haven't changed much. And so the actual  
13 studies that we talked about, studies in the Lamar County  
14 hearing, studies two and three, two was hand wire brushing,  
15 MAS gasket studies three was hand wire brushing and electric  
16 wire brushing. Those exact same studies that, exact same data  
17 was published in one of the more prestige peer-review  
18 industrial hygiene journals. Took me a long time to try to  
19 figure out or reconcile why on the one hand judge clearly  
20 stated in a 12-page decision that my studies were junk science  
21 on the gasket studies. On the other hand, one of the more  
22 prestigious industrial hygiene journals in the world published  
23 it.

24 And as I've had to testify a number of times, the only  
25 thing I can think of is that I did a horrible job explaining

1 my work to that judge.

2 Q. And, in fact, are you aware after that order where people  
3 sent that order to the editor of the journal that you were  
4 trying to publish your article?

5 A. Yes, sir. After they'd gone through the peer-review  
6 process and accepted for publication, that Lamar County Order  
7 was actually sent to the editor to try to derail the  
8 publication.

9 So there has been some criticisms that maybe the  
10 peer-reviewers didn't know all the facts about our study.

11 The editor received the Lamar County hearing, and  
12 certainly the editor is the final reviewer. The editor just  
13 makes the decision if the paper goes forward or not,  
14 ultimately.

15 There was nothing in the -- there was nothing in the  
16 Lamar County hearing, excuse me, there was everything that the  
17 criticisms that have been leveled against our studies was in  
18 that hearing. So -- was in that order. So the editor always  
19 had the ability to pull the paper if he thought it was  
20 unscientific.

21 Q. In fact, are you aware that Mr. Mangold, Mr. Liukonen  
22 folks who had testified on behalf of Garlock in asbestos  
23 litigation, had conversations or sent materials to the editor  
24 to try to keep this paper from being published?

25 A. After it came out that the paper was accepted, it was

1 going to be published, Mr. Mangold wrote a letter to the  
2 editor, I think it was Larry Pearce, and sent along Lamar  
3 County hearing, actually suggesting they should pull the  
4 paper, even though they might be sued.

5 Larry Liukonen actually called the editor trying to get  
6 the publication stopped. I don't mean get the peer-reviewed  
7 process stopped. I mean get the fact that the paper had been  
8 accepted, and was ready to be published and get it stopped at  
9 that point.

10 Q. Now Dr. Longo, anything about that entire process, and I  
11 guess after Lamar County, have you continued to testify across  
12 the country about these gasket studies? Has Mr. Hatfield, one  
13 of the individuals who works for you, has he testified in  
14 places like Los Angeles, California, Alameda, California and  
15 other places using these particular studies and this data set?

16 A. Yes, sir.

17 Q. In fact, are you aware that experts from across the  
18 country rely on these things and testify, the peer-review  
19 studies that you've done?

20 A. Yes, sir. The gasket studies have been used many times,  
21 and these same studies, the paper, has been used many times in  
22 many courts across the country.

23 Q. And since that time, Dr. Longo, have you, yourself, been  
24 in court and testified using the various studies that we used  
25 today?

1 A. Yes, sir, I have.

2 Q. Now -- in the State of Texas also?

3 A. Yes, sir.

4 Q. Now, the last thing I want to talk to you about very  
5 briefly is, there's been some questions about whether asbestos  
6 actually adheres to gaskets. Because when Mr. Boelter was  
7 here, we showed some videos of his where the gasket came out  
8 and it was in one piece, and he and I had a discussion about  
9 what was intact or not.

10 Would you say if asbestos -- if a gasket comes out and  
11 it's one entire piece, would that be intact?

12 A. I would call that intact.

13 Q. Okay.

14 A. But I need to -- it's -- it's not the asbestos that  
15 sticks to the gasket. I just need to -- I'm sorry, I don't  
16 mean to correct you.

17 Q. No. No. You're the expert, not me.

18 THE COURT: You meant the gasket to the flange?

19 THE WITNESS: Right.

20 MR. FROST: Right.

21 THE WITNESS: It's not the asbestos that causes it  
22 to stick. It's actually the synthetic rubber which is a  
23 viscoelastic material that flows down into the cracks and  
24 crevices and then adheres over time because the chemistry  
25 change. That's what's causing the --

1 BY MR. FROST:

2 Q. Is there anything in regards to the tools that the  
3 pipefitter used -- there was some discussion that maybe you  
4 guys were jamming them in and those flanges were very  
5 sensitive and you were causing ripples in it. Anything about  
6 those tools that caused any of that that you're aware of?

7 A. A solid steel flange beats a putty knife. No. Again,  
8 this was a pipefitter doing this work. And to me, you can't  
9 have it both ways.

10 Either these gaskets can release asbestos fibers,  
11 depending on the work activity you're doing or they can't.  
12 You know, there's no middle ground here.

13 So if the activity being suggested is too rough, too  
14 aggressive, and that's why we got our fiber levels. Well  
15 hence, that means gaskets can release significant fibers.

16 Then you have to look at the work activities of the  
17 workers. If it's the fact that these gaskets are encapsulated  
18 and cannot release fibers, then it wouldn't matter what work  
19 activity you do to it. The work activities that we're doing  
20 is what the pipefitters did, is what I read in depositions,  
21 what I hear when I talk to folks about these are common  
22 techniques.

23 It's -- I don't believe, it's not my opinion, that these  
24 activities are causing all this severe damage to the flange.  
25 You got to remember, what they're trying to do when they have

1 the putty knife, and they're trying to get up under, break  
2 through the gasket and get up under to try to lift as much off  
3 of the gasket as they can.

4 Q. And Dr. Longo, are you aware that Garlock is also aware  
5 of the fact that they even developed some gaskets that had  
6 antistick coating to try to deal with this exact issue?

7 A. Yes, sir. I think this is some of the best evidence that  
8 asbestos -- that gaskets stick to flanges and is a problem.  
9 Or if it didn't, why would a company who sells gaskets spend  
10 time and research and effort back in 2009 to develop a gasket  
11 that will not stick to a flange?

12 Q. And in fact, have they done videos where they describe  
13 the types of materials that they're trying to develop to try  
14 to keep gaskets from sticking to flanges?

15 A. Yes, sir.

16 Q. And you've reviewed those?

17 A. I have.

18 Q. Okay.

19 (Video plays.)

20 Q. So Dr. Longo, the first parts that we saw there were not  
21 using this new technology, but using the older technology, not  
22 the antistick, correct?

23 A. Yes, sir, that's correct.

24 Q. And what's important about what we've just seen in  
25 regards to your studies and how they relate to whether they

1 are replicable or whether the techniques you guys used or what  
2 was being used in industry?

3 A. I think most importantly here it shows that a gasket  
4 being put into a test flange and brought to a temperature of  
5 400 degrees Fahrenheit for only 24 hours, stuck and hardened  
6 the gasket.

7 Notice the comment there that the gasket was harder than  
8 the brass chisel, and they had to use the same techniques that  
9 we used in order to get the gaskets off our flanges where you  
10 had to get a carbon steel putty knife. They're using the  
11 blade portion of it, and hitting it with a hammer.

12 If a gasket can stick to that degree in 24 hours at 400  
13 degrees Fahrenheit, think about in a steam system where these  
14 gaskets can be in there from months to years. So the  
15 suggestion that they don't really stick is just not -- is just  
16 not feasible. Of course they stick, it's the main problem.

17 If you read their literature, they talk about the  
18 viscoelastic properties of gasket. And what visco -- viscus  
19 and elastic, it flows. It flows into the crevices and over --  
20 in that elevated temperature and pressure it adheres, Garlock  
21 says it happens.

22 So the finding of our studies where the gaskets, these  
23 synthetic rubber chrysotile gaskets stick, is not something  
24 that I made up. It is something that pipefitters and  
25 steamfitters talk about repeatedly, that the problem of

1 removing these gaskets.

2 And I think this was 2009 that this came out, I interpret  
3 that as Garlock has done the research to figure out how to  
4 make gaskets for these extreme conditions, elevated  
5 temperature and pressure not stick.

6 So if they're doing this in 2009, how can they say this  
7 did not happen in the '50s, the '60s, the '70s and the '80s?

8 MR. FROST: And Dr. Longo, we have marked as ACC  
9 Exhibit 3645 your CV.

10 Your Honor, we would offer that into evidence at  
11 this time.

12 MR. HARRIS: No objection, Your Honor.

13 MR. FROST: And, Your Honor, we would offer for  
14 demonstrative purposes and for Rule 104 purposes, Dr. Longo's  
15 expert report and exhibits, which is ACC 3646; Dr. Longo's  
16 expert rebuttal report and exhibits, which is ACC 3647. We  
17 would also offer the PowerPoint for demonstrative and Rule 104  
18 purposes as ACC 3649, and the videotapes and other  
19 demonstratives including the videos we just showed as ACC 3785  
20 for demonstrative and Rule 104 purposes.

21 MR. HARRIS: No objection, Your Honor.

22 THE COURT: We will admit those.

23 (ACC's Exhibits No. 3645, 3636, 3647, 3649, 3685  
24 were received into evidence.)

25 MR. FROST: And Your Honor, pass the witness.

1 THE COURT: Want to break for lunch now? It's a  
2 good time. Just come back at quarter to 2:00. Will that give  
3 you enough time?

4 MR. HARRIS: Yes, Your Honor.

5 (Lunch recess at 12:40 p.m.)

6 \* \* \* \* \*

7 UNITED STATES DISTRICT COURT  
8 WESTERN DISTRICT OF NORTH CAROLINA  
9 CERTIFICATE OF REPORTER

10 I, Laura Andersen, Official Court Reporter, certify  
11 that the foregoing transcript is a true and correct transcript  
12 of the proceedings taken and transcribed by me to the best of  
13 my ability.

14 Dated this the 29th day of July, 2013.

15 s/Laura Andersen  
16 Laura Andersen, RMR  
17 Official Court Reporter  
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Laura Andersen, RMR 704-350-7493